

ITP

6

FINAL REPORT

**FOCUSED SITE INVESTIGATION
FORMER NIKE BATTERY, C-70
NAPERVILLE, ILLINOIS**

EPA Region 5 Records Ctr.



379025

Contract DACA49-95-D-0001
Delivery Order 0004

Prepared For:

U.S. Army Corps of Engineers
Buffalo District
Buffalo, New York 14207

Prepared By:

Maxim Technologies, Inc.
1908 Innerbelt Business Center Drive
St. Louis, Missouri 63114-5700

RELEASABLE

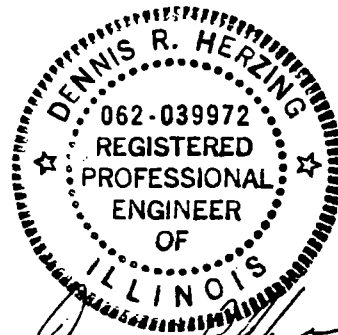
MAY 20 2002

October 1997

REVIEWER MM

4294

Engineering aspects of this Final Report for the Focused Site Investigation at the Former Nike Missile Battery C-70, Naperville, Illinois have been reviewed and approved by the undersigned Registered Professional Engineer.



Dennis R. Herzing 5/1/97

Dennis R. Herzing, P.E.
Registered Professional Engineer

TABLE OF CONTENTS

<u>Section No.</u>		<u>Page No.</u>
1.0	EXECUTIVE SUMMARY	1-1
1.1	Authority	1-1
1.2	Project Objectives	1-1
1.3	Background Information	1-1
1.4	Areas of Concern	1-2
1.5	Site Investigations	1-3
1.6	Results	1-3
1.7	Recommendations	1-4
2.0	SITE INVESTIGATION REPORT OBJECTIVES	2-1
2.1	Project Scope and Objectives	2-1
2.2	Data Quality Objectives	2-3
3.0	GENERAL PROPERTY REVIEW INVESTIGATION	3-1
3.1	Summary of Previous Contamination Investigations	3-1
3.2	Additional Background Information	3-2
4.0	SAMPLING AND TESTING METHODS	4-1
4.1	Utilities Check and Magnetometer Survey	4-1
4.2	Sampling Methods	4-1
4.3	Analytical and Physical Testing Methods	4-4
4.4	Sampling Program	4-5
4.5	Sample Collection, Preservation, Transportation	4-11
	and Chain-of-Custody	
4.6	QA/QC Samples	4-12
4.7	Investigative Derived Wastes (IDW)	4-13
5.0	PHYSIOGRAPHY, TOPOGRAPHY, GEOLOGY, HYDROLOGY, 5-1	
	AND HYDROGEOLOGY	
5.1	Physical Setting	5-1
5.2	Site Geology, Hydrology and Hydrogeology	5-1
5.3	Groundwater Targets	5-2
6.0	REGULATORY CRITERIA USED FOR DATA EVALUATION . 6.1	
6.1	Regulatory Criteria Used for Soil Data Evaluation	6-2
6.2	Regulatory Criteria Used for Groundwater Data Evaluation	6-3
7.0	FIELD INVESTIGATION RESULTS	7-1
7.1	Soil Screening	7-1
7.2	Soil Investigation Results	7-1
7.3	Groundwater Investigation Results	7-4
7.4	Surface Water Investigation Results	7-6

TABLE OF CONTENTS (Continued)

<u>Section No.</u>		<u>Page No.</u>
8.0	ANALYTICAL LABORATORY RESULTS	8-1
8.1	Analytical and Physical Testing Results	8-1
8.2	Groundwater Analytical Results	8-3
8.3	Comparison of Screening (XRF) and Confirmatory (Lab) Sampling Results	8-5
9.0	SITE INVESTIGATION CONCLUSIONS	9-1
9.1	Identification of Contaminants of Concern	9-1
9.2	Summary of Results	9-4
10.0	RECOMMENDATIONS	10-1

REFERENCES

LIST OF TABLES

Table No.

4-1	Analytical Methods
4-2	Elemental Screening Method Detection Limits
4-3	Estimated Project Quantitation Limits For FUDS SI's in Illinois Volatiles Target Compound List
4-4	Estimated Project Quantitation Limits For FUDS SI's in Illinois Semi-Volatiles Target Compound List
4-5	Estimated Project Quantitation Limits For FUDS SI's in Illinois Inorganic Target Analyte List
4-6	Summary of Water Collection, Preservation, and Storage Requirements for Each Sample
4-7	Summary of Soil Collection, Preservation, and Storage Requirements for Each Sample Parameter
6-1	Summary of Soil Cleanup Objectives Volatile Organic Compounds
6-2	Summary of Soil Cleanup Objectives Semi-Volatile Organic Compounds
6-3	Summary of Soil Cleanup Objectives Metals; pH
6-4	Summary of Groundwater Cleanup Objectives Volatile Organic Compounds
6-5	Summary of Groundwater Cleanup Objectives Semi-Volatile Organic Compounds
6-6	Summary of Groundwater Cleanup Objectives Metals

LIST OF TABLES

(Continued)

Table No.

7-1	Summary of XRF Analytical Results Soil Boring and Hand Auger Samples
7-2	Summary of Groundwater Sampling Collection Data
7-3	Summary of Existing Sampling Activities
8-1	Summary of Analytical Results for Metals (As, Cr, Pb) & pH Background Soil Boring Samples
8-2	Summary of Analytical Results for Metals (As, Cr, Pb) & pH Background Hand Auger Samples
8-3	Summary of Analytical Results for Metals (As, Cr, Pb) & pH Soil Boring and Hand Auger Samples
8-4	Summary of Analytical Results for BTEX Soil Boring and Hand Auger Samples
8-5	Summary of Analytical Results for Volatile Organics Groundwater and Surface Water Samples
8-6	Summary of Analytical Results for Semi-Volatile Organics Groundwater and Surface Water Samples
8-7	Summary of Analytical Results for Dissolved Metals (As, Cr, Pb) Groundwater and Surface Water Samples
8-8	Summary of Analytical Results for Total Metals (As, Cr, Pb) Groundwater and Surface Water Samples
8-9	Summary of Analytical Results for BTEX Compounds Groundwater Samples
8-10	Comparison of the XRF Analytical Results With the Confirmation Analysis Performed in The Maxim Laboratory

LIST OF FIGURES

Figure No.

3-1	Regional Map
3-2	Site Map
3-3	Approximate Boundaries and Owners for each Area of Concern
3-4	Site Layout Map Overlay of Nike Battery Features
4-1	Sample Location Map
5-1	Direction of Groundwater Gradient

LIST OF EXHIBITS

Exhibit No.

3-1	"Old Nike Center Sewer" Line
3-2	Real Estate Map

LIST OF APPENDICES

Appendix

- B Photograph Documentation
- F Response to Comments

SECTION 1

1.0 EXECUTIVE SUMMARY

1.1 Authority

This report provides the results of a Focused Site Investigation of the former Nike Missile Battery C-70, Naperville, Illinois. The Focused Site Investigation was conducted under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the US Department of the Army. The work was performed under contract to the Buffalo District Corps of Engineers and in accordance with the DSMOA agreement with Illinois Environmental Protection Agency.

1.2 Project Objectives

The primary objective of this Focused Site Investigation was to identify the presence of potential contaminants of concern in soil, groundwater, and surface water at the location of the former launch area and former Ready Building. This contaminant screening procedure included evaluation of the presence of soil, groundwater, and surface water contaminants and assessment of potential migration pathways through sampling and analysis. Results were compared with regulatory criteria recently proposed by Illinois EPA in a draft guidance document ["Tiered Approach to Corrective Action Objectives" (TACO February, 1997)], used to assess health risks and cleanup objectives at hazardous waste sites.

In accordance with IEPA guidance, results of sampling and analysis performed through this Focused Site Investigation have been compared with the most conservative risk-based screening limits defined in the TACO, including comparison with the limits for protection of Class I groundwater and the limits which apply to residential rather than industrial property. The purpose for this conservative approach was to enable elimination of target analytes as potential contaminants of concern in future studies if they were not detected above the most conservative screening levels used in this Focused Site Investigation. Land use at this site has been commercial for approximately 12 years.

1.3 Background Information

The former Nike Missile Battery, C-70 is located in Naperville, DuPage County, Illinois. Naperville is within the western portion of the Chicago Metropolitan Area. The subject property is located southwest of the intersection of Diehl and Park streets near the northern boundary of the City of Naperville, in the southeast quarter of Section 1, T.38N, R.9E. The property occupies approximately 47.28 acres.

The Department of Defense purchased the property for Battery C-70 in 1955 and 1956. After construction, the site served as one of the Nike anti-aircraft missile batteries in the Chicago Metropolitan Area.

The missile battery was declared surplus in 1964, deactivated and sold. The site changed owners several times. Currently 33.06 acres are privately owned and partially developed as an office park, the "Park Place of Naperville". Approximately half of the office park has been developed, the western half. There are five office buildings that make up the office park complex. The eastern half of the office park was an undeveloped field of weeds and grasses owned by the O'Connell family. The remaining 14.11 acres of the launch site are owned by the Naperville Park District and used as a recreational sports complex, appropriately named "Nike Park". The former Ready Building area is currently owned by Tri Peak Investment, LLC (See Figure 3-3).

Approximately half of the office park has been developed, the western half. There are five office buildings that make up the office park complex. The eastern half of the office park was an undeveloped field of weeds and grasses.

The remaining 14.11 acres of the launch site are owned by the Naperville Park District and used as a recreational sports complex, appropriately named "Nike Park".

1.3.1 Site Geology and Hydrogeology

The geology at the site consists of silty clays interbedded with sands and gravels. This material is probably the Equality Formation. A general description of the strata encountered is as follows: nine to fifteen feet of silty clay; over, 30 to 35 feet of sandy gravel (up to 3" in diameter); below the gravel was a medium sand (thickness unknown).

Ground water was encountered during the drilling of all of the temporary well points (TWP's), at depth ranging from 34.1' to 48.4' bgl. The water level data collected from the permanent monitoring wells ranges from 30.75 to 36.65 feet below top of casing (PVC). The water level elevations vary slightly across the site from 699.82 to 700.23 feet in elevation. Based upon the limited data available from the three monitoring wells, it appears that the ground water gradient is in a south easterly manner.

1.3.2 Groundwater Targets

The City of Naperville receives all of its drinking water from Lake Michigan. The City wells are for emergency supply only. The local ground water is not used as a source of drinking water. It does not appear that there are any ground water targets within the C-70 study area.

1.4 Areas of Concern

Building 1717

Building 1717 was constructed on or in the immediate vicinity of the following missile battery structures: acid neutralization pit, fueling stations, pump house, missile assembly and test building and generator building.

Wass Consulting Group Building

The Wass Consulting Group Building which is currently owned by Tri-Peak Investments, LLC, was constructed upon or very near the foundation of the former Ready Building. The Ready Building was possibly, but not confirmed to have been heated with fuel oil from an underground storage tank.

1.5 Site Investigations

1.5.1 Past Data Collection

A Contamination Evaluation was performed by the IT Corporation in January of 1988 and included sampling of three monitoring wells and soil boring sampling. Slightly elevated levels of chromium were detected in soil samples associated with the installation of the three monitoring wells, and elevated arsenic levels were also detected in soils collected during the installation of well MW-2. Also collected were unfiltered groundwater samples that exceeded the State of Illinois Class I Groundwater standards for arsenic (As), chromium (Cr) and lead (Pb).

In 1991 ARDL Inc., collected filtered and unfiltered samples from the three monitoring wells and analyzed them for As, Cr and Pb. The results of the dissolved metals analyses were below the Illinois Class I Groundwater criteria.

Low levels of total petroleum hydrocarbons (TPH) were detected in the groundwater sampled by IT during their sampling activities conducted in 1988. The sampling activities and results are identified in IT's January 1991 Report. The TPH levels were: 1.1 ug/L in MW-1; 0.9 and 2.1 ug/L (duplicate samples) in MW-2; and 0.8 ug/L in MW-3.

1.5.2 Current Investigation

Ten temporary well points (TWP) were installed from December 9, 1996 through December 15, 1996 as a part of this investigation. Auger drilling methods were used to advance each borehole. Three soil samples were collected from each TWP boring, and screened for As, Cr and Pb using X-ray fluorescence (XRF). The results of the XRF analyses were used to select a sample for confirmation in the Maxim St. Louis Laboratory. One soil sample was collected from each borehole for BTEX analysis. Groundwater samples were collected from each TWP and analyzed for dissolved metals (As, Cr and Pb) and BTEX compounds.

The three existing monitoring wells were sampled and analyzed for VOCs, SVOCs and dissolved metals (As, Cr and Pb). Six shallow (1 to 3 feet deep) soil samples were collected and analyzed for metals (As, Cr and Pb) and BTEX compounds. One groundwater sample was collected from the City of Naperville public water supply well No. 10, located approximately 2,000 feet west of the site. The sample was analyzed for VOC, SVOC, total and dissolved metals (As, Cr and Pb).

1.6 Results

1.6.1 Groundwater

The only indications of groundwater contamination detected at the site are the VOC and SVOC library search compounds found at low levels in all of the samples.

The VOC library search compounds are predominantly petroleum related compounds at estimated values ranging from 5 to 32 ppb. The SVOC library search compounds are also predominantly petroleum related compounds at estimated values ranging from 0.9 to 56 ppb.

1.6.2 Soils

The metals were found at levels above the Tier 1 CUOs and above the average background level for soil in a metropolitan area (App. A, Table G, IEPA TACO). The levels of these metals found in the upper strata (0 to 16' bgl) were relatively consistent throughout the site. The results of the background soils samples are comparable with the results of the samples from the two areas of concern.

The results of the soil samples collected from the lower strata at 40 to 41 feet bgl exhibit metals values an order of magnitude lower than the soil samples collected from the upper strata. This data from the lower strata and the data from the groundwater samples indicate that the metals in the upper zone are not migrating downward into the water bearing zone.

1.7 Recommendations

The USACE should follow the Tiered Approach procedures presented in the TACO (IAC 35) document for closure of the site.

SECTION 2

2.0 SITE INVESTIGATION REPORT OBJECTIVES

2.1 Project Scope and Objectives

The purpose of this Focused Site Investigation was to determine if previous DOD activities at the former Nike Battery C-70, resulted in the presence of environmental contamination. Specific objectives stated in the Scope of Work (Appendix A) include the following:

2.1.1 Scope

The scope of the project was to perform a Focused Site Investigation (SI) on the location of the former Nike Missile Battery C-70. The Focused SI consisted of: performing a records review to gather pertinent information on the historical land use and operations; collecting soil and groundwater samples from ten borings/temporary monitoring wells; collecting soil samples from six shallow boring locations; collecting groundwater sample from the City of Naperville water supply well No. 10; and collecting surface water samples from each of two storm water retention ponds on site.

2.1.2 Scope Modifications

Based on the results of the site survey, interviews, and records evaluations, Maxim Engineering and Environmental suggested modifications to the Scope of Work initially received from the Buffalo District. IEPA also provided input. The following changes to the Scope of Work have been agreed upon through communication between Maxim and the Buffalo District, Corps of Engineers.

2.1.2.1 - The temporary well points were installed using a conventional drill rig and hollow stem augers. Considering the geologic conditions at the site, the direct push method, originally scoped, did not appear to be practical.

2.1.2.2 - The soil sample locations were altered from the original SOW. The selected soil sample locations were similar to those presented in the original SOW.

2.1.3 Objectives

The objective of this Focused SI was to determine the presence or absence of heavy metal (As, Cr and Pb), petroleum compounds (benzene, toluene, ethyl benzene and xylene), volatile organic compound and semi-volatile organic compound contamination in areas where Nike Missile Battery operations occurred, and preparation of an engineering report to summarize the results of the investigation and provide recommendations regarding future environmental investigations and future remediation activities at the site.

In order to achieve the objectives identified above, Maxim has conducted the following activities:

- Reviewed records and previous environmental studies performed at the site in order to assess site history, location, physiography, ownership and prior land use, the nature of previous activities that may have resulted in environmental contamination, and previous environmental studies on-site.
- A walk over survey was performed on August 14, 1996 to identify potential sources of contamination and provide a basis for selection of sampling locations.
- Interviews were conducted with current and past owners of the site, along with the managers of the construction company that built the Park Place of Naperville. The interviews were conducted to identify potential sources and locations of hazardous waste which may have been caused by DOD related activities.
- A magnetometer search and utility check was performed in order to assess the presence of subsurface utilities in proximity to intended sampling locations.
- Groundwater samples were collected from each of three existing monitoring wells (MW-1, MW-2, and MW-3) and analyzed for TCL volatile organics compounds (VOCs), TCL semi-volatile organics compounds (SVOCs) and dissolved metals (As, Cr, and Pb).
- Shallow soil sampling was performed to determine if there is evidence of soil contamination in the berm area. The samples were screened for the metals (As, Cr and Pb) by XRF. The metals parameters were chosen based on previous on-site sampling/analysis results.
- Subsurface soil sampling and groundwater sampling was performed to assess the presence and extent of possible contamination at areas suspected of being sources of contamination. The subsurface exploration included continuous logging of the boreholes, and screening of the cuttings using an organic vapor meter. One groundwater sample was collected from each borehole at a depth determined by the Site Manager in order to evaluate potential contamination.
- Surface water samples were collected from each of the two Storm Water Retention Ponds. The samples were analyzed for VOCs, SVOC and total and dissolved metals (As, Cr and Pb).
- A groundwater sample was collected from the City of Naperville Public water supply well No. 10. The sample was analyzed for VOCs, SVOCs and dissolved total metals (As, Cr and Pb).
- No Investigation-derived wastes were accumulated. As agreed upon with IEPA, all boring cuttings were used to backfill the boreholes and the decontamination and purge water was allowed to discharge onto the ground.

- At TWP-4 and Water Supply Well No. 10, two split samples were collected for all analyses except total metals and sent to the MRD QA Laboratory.
- Data from the Site Investigation was used to determine if former DOD activities at the former Nike Missile Battery C-70 have resulted in continued presence of environmental contamination. The extent of contamination was evaluated to the extent possible. Analytical results were compared to applicable Federal and State evaluation criteria and background levels. Recommendations concerning any further investigations or remediation were made.

2.2 Data Quality Objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements which specify the quality of the data required to support decisions and are based on the end uses of the data to be collected. As such, different data uses may require different levels of data quality. In the past, USEPA defined five analytical levels which address various data uses and the QA/QC effort and methods required to achieve the desired level of quality. These former levels included:

- Screening (DQO Level 1): This provides the lowest data quality but the most rapid results. It is often used for health and safety monitoring at a site, preliminary comparison to ARARs, initial site characterization to locate areas for subsequent and more accurate analyses, and for engineering screening of alternatives (bench-scale tests). These types of data include those generated on-site through the use of HNU, pH, conductivity, and other real-time monitoring equipment at a site.

Screening data generated during the Site Investigation included the use of the HNU 101 or OVM 580B for organic vapor meter observations, use of Gastech GX-82 for continuous monitoring for combustible gases, percent oxygen, and/or carbon monoxide.

- Field Analyses (DQO Level 2): This provides rapid results and better quality than in Level 1. For example, this level may include mobile lab generated data depending on the level of quality control exercised.

No DQO Level 2 Screening data was generated during this Focused Site Investigation.

- Engineering (DQO Level 3): This provides an intermediate level of data quality designed to provide confirmed identification and quantification of organic and inorganic analyses in water, soil, and sediment media. Level III protocols all have built-in QA/QC including external QA in the form of trip blanks, replicate samples, and blind samples. Level III analytical methods and protocols are identified in Test Methods For Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition and subsequent Updates. Level III data is used for site characterization, confirmation of Level I and Level II field data, establishing cleanup objectives, and environmental monitoring to demonstrate attainment of cleanup objectives or compliance with applicable standards. Level III data should

provide sufficient documentation to allow qualified personnel to review, evaluate, and validate data quality in accordance with acknowledged standards and protocols. Confirmatory soil and water samples collected and analyzed in the laboratory for RAS parameters, dissolved metals, and petroleum hydrocarbons were Level 3 data.

- Confirmational (DQO Level 4): This provides the highest level of data quality and is used for purposes of risk assessment and evaluation of remedial alternatives. These analyses require full USEPA Contract Laboratory Program (CLP) analytical and data validation procedures in accordance with EPA recognized protocol. Level IV analyses are typically required for the conduct of CERCLA compliant and equivalent remedial response.

No Level 4 data was generated.

- Non-Standard (DQO Level 5): This refers to analyses by non-standard protocols, for example, when exacting detection limits or analysis of an unusual chemical compound is required. These analyses often require method development or adaptation. The level of quality control is usually similar to DQO Level 4 data.

No Level 5 data was generated.

Recent USEPA guidance simplified the analytical levels described above to two levels; screening data and definitive data. Former Level 1 and Level 2 data would be considered screening data. Screening data is described as "data generated by rapid, less precise methods of analysis with less rigorous sample preparation. Sample preparation steps may be restricted to simple procedures such as dilution with a solvent, instead of elaborate extraction/digestion and cleanup. Screening data provides analyte identification and quantification, although the quantification may be relatively imprecise. At least 10% of the screening data are confirmed using analytical methods and QA/QC procedures and criteria associated with definitive data. Screening data without associated confirmation data are not considered to be data of known quality. "

Levels 3, 4, and 5 are generally considered definitive data. Definitive data is described as "generated using rigorous analytical methods, such as approved EPA reference methods. Data are analyte-specific, with confirmation of analyte identity and concentration. Methods produce tangible raw data (e.g., chromatograms, spectra, digital values) in the form of paper printouts or computer-generated electronic files. Data may be generated at the site or at an off-site location, as long as the QA/QC requirements are satisfied. For the data to be definitive, either analytical or total measurement error must be determined. "

SECTION 3

3.0 GENERAL PROPERTY REVIEW INVESTIGATION

3.1 Summary of Previous Contamination Investigations

3.1.1 Site Location

The former Nike Missile Battery, C-70 is located in Naperville, DuPage County, Illinois. Naperville is within the western portion of the Chicago Metropolitan Area (Figure 3-1). The subject property is located southwest of the intersection of Diehl and Park streets near the northern boundary of the City of Naperville, in the southeast quarter of Section 1, T.38N, R.9E. The property occupies approximately 47.28 acres (Figure 3-2).

3.1.2 Past Activities

The Department of Defense purchased the property for Battery C-70 in 1955 and 1956. After construction, the site served as one of the Nike anti-aircraft missile batteries in the Chicago Metropolitan Area that were used "as a deterrent to any Soviet Russian aggression" [1].

The missile battery was declared surplus in 1964, deactivated and sold. The site changed owners several times [2]. Currently 33.06 acres are privately owned and partially developed as an office park, the "Park Place of Naperville". Current ownership of the study area is depicted on Figure 3-3.

Approximately half of the office park has been developed, the western half. There are five office buildings that make up the office park complex. The eastern half of the office park was an undeveloped field of weeds and grasses owned by the O'Connell family. The remaining 14.11 acres of the launch site are owned by the Naperville Park District and used as a recreational sports complex, appropriately named "Nike Park".

There is only one remaining missile battery structure on the site. The southern most missile silo has been incorporated into Building 1717 and it is used for the storage of documents by its tenants.

3.1.3 Areas of Concern

Building 1717

Building 1717 was constructed on or in the immediate vicinity of the following missile battery structures: acid neutralization pit, fueling stations, pump house, missile assembly and test building and generator building (Figure 3-4). The former structures are sites where past DOD activities warrant investigation into the presence of contamination generated during the operation of the missile battery.

Wass Consulting Group Building

The Wass Consulting Group Building (own by Tri-Peak Investment, LLC), was constructed upon or very near the foundation of the former Ready Building (Figure 3-4). The Ready Building was possibly, but not confirmed to have been heated with fuel oil, which was usually stored in an underground storage tank (UST) near the building. The UST could be a source of petroleum contamination in the soil and/or groundwater.

3.1.4 Past Data Collection

A Contamination Evaluation was performed by the IT Corporation in January of 1988 (Final Report January 1991).[3] IT sampled three monitoring wells and performed soil boring sampling. Slightly elevated levels of chromium were detected in soil samples associated with the installation of the three monitoring wells, and elevated arsenic levels were also detected in soils collected during the installation of well MW-2. Also collected were unfiltered groundwater samples that exceeded the State of Illinois Class I Groundwater standards for arsenic (As), chromium (Cr) and lead (Pb).

In November of 1991 ARDL Inc., collected filtered and unfiltered samples from the three monitoring wells and analyzed them for As, Cr and Pb. The Pb sample analyzed by ARDL did not have a low enough detection limit to allow the comparison of the laboratory results with the Illinois Class I Groundwater criteria. The filtered Pb samples were reanalyzed in February of 1992 and the results were below the Illinois Class I Groundwater criteria.

Low levels of total petroleum hydrocarbons (TPH) were detected in the groundwater sampled by IT. The TPH levels were: 1.1 ug/L in MW-1; 0.9 and 2.1 ug/L (duplicate samples) in MW-2; and 0.8 ug/L in MW-3.

3.2 Additional Background Information

3.2.1 Population

The former Nike Battery C-70 is located in the northern portion of the City of Naperville just south of Interstate 88 (the East-West Tollway). The City of Naperville is part of the greater Chicago Metropolitan Area. Naperville has a 1996 population of 109,000 [4] and the Chicago Standard Metropolitan Statistical Area (SMSA) has a population of 7,410,858 [5].

3.2.2 Pre-1950s Land Use

Based upon the review of aerial photographs, prior to the construction of the C-70 Missile Battery, the site was used for agricultural row crops.

3.2.3 Battery Construction and Operation

Property was purchased for the Nike Missile Battery C-70 in 1955 and 1956. Construction of the battery probably began in 1956 or 1957. Construction of the missile batteries was reported to have taken five to seven months [6]. It was operated as a DOD facility until it was declared surplus in 1964.

3.2.3.1 Waste Water Effluent Disposal

During a tele-conference with the IEPA, Buffalo District USACE and Maxim (while addressing comments on the Draft Report), the issue of waste water disposal at Nike Battery C-72 was discussed. The method of disposal of the waste water effluent generated by the operations at the Battery was still unknown. Aerial photographic review of the site did not indicate the presence of a leach field or sand filter, nor the discharge points from the silo sump pumps. The original drawings of the Battery could answer the question of waste water disposal, but they must have been destroyed. IEPA suggested that Maxim should perform an ancillary archive search at the Naperville Public Utilities Department. In an attempt to answer the question of waste water disposal, Maxim made an additional trip to Naperville to access the archived drawings of the Public Utilities Department.

While at the Public Utilities Department an old (undated) aerial photograph which identified sewer lines, was found. Depicted on the photograph was a sewer line that extended from Bauer Road (approximately 1,500 feet south of the site) to the fence line of the Nike site. The sewer line was labeled "Old Nike Center Sewer". At the juncture where the sewer line connected with the main line at Bauer Road, a label read "Permanent Plugged" (Exhibit 3-1).

An additional map of the real estate boundaries of "Nike Battery 70, Military Reservation (December 1963)" was also found. The real estate map depicts a utility easement that extends from Bauer Road to the launch site (Exhibit 3-2). The easement, which is labeled "Perp. Sewer & Utility Easement from 8 Feb. 1957", appears to be in the same general location as the sewer line depicted on Exhibit 3-1.

Based upon the information depicted on the aerial photograph and on the real estate map, the disposal of waste water from the Battery is believed to be through the municipal sewer system.

3.2.4 Post DOD Land Use

From 1964 until the construction of the office park in 1985 or 1986, the site of the former Nike Battery was undeveloped. The site was vandalized, most buildings were removed and the earthen berm was removed. Interviews with Mr. George O'Connell (who owned the site prior to the office park development) indicated that there were only two buildings remaining (Pump House and Ready Building) when he first visited the site in 1970. After Mr. O'Connell purchased the property in 1973 he demolished the Ready Building and the Pump House. At the direction of the DuPage County Health Department, Mr. O'Connell closed and sealed the facility water supply well that was located under the Pump House.

3.2.5 Land Use Since 1985

Based upon an interview with Mr. Terrance Shaw and Jim Siciliani of I.C. Harbour Construction Company, the construction of the Park Place of Naperville began in 1985 or 1986. Mr. Siciliani stated that when he first visited the site there were no buildings present and the earthen berm (formerly around the Fueling Area) had also been removed. Since the construction of the Park Place of Naperville, the land use of the majority of the site has been an office park.

The western half of the former battery is currently used as a recreational area, Nike Park. This area has apparently been a park since the mid-1980s, owned by the Naperville Park District.

3.2.6 Aerial Photograph Review

Maxim reviewed aerial photographs from the following years to aid in the assessment of past usage of the site and selection of sampling locations: 1954, 1961, 1967, 1972, 1973, 1976, 1982, 1988, 1992 (source: IDOT), 1992 (source: City of Naperville). Photos were obtained from the United States Department of Agriculture and the Illinois Department of Transportation (through Illinois EPA) and the City of Naperville.

Relevant portions of the photographs are presented in Appendix B.

SECTION 4

4.0 SAMPLING AND TESTING METHODS

4.1 Utilities Check and Magnetometer Survey

Prior to conducting intrusive activities, the local utility companies were contacted through JULIE, the Illinois underground utilities locator service. On December 9, 1996 Maxim met with Barofsky Associates Operation Director to walk throughout the site and check for buried utilities utilizing maps of the site. A magnetometer survey was also conducted in order to ensure each probing/drilling location was clear of buried utility lines. Boring locations were then staked.

Safety at each probing/drilling site was ensured by the Maxim Site Manager and the Field Safety Officer through inspection of the site utilities maps and magnetometer screening with a Schonstedt GA52 magnetometer. Soil sampling did not take place within 5 feet of a subsurface anomaly.

4.2 Sampling Methods

All sampling and field measurement procedures were consistent with guidelines published in USEPA "Test Methods for Evaluating Solid Wastes (SW-846, Third Edition) and revisions to SW-846, "Engineering and Design, Chemical Data Quality Management for Hazardous Waste Remedial Activities, October 1990 (CER 1110-1-263). A field log, described in Section 5.1.2 of the QAPP, was kept which details the field activities for each day.

4.2.1 Soils Sampling

4.2.1.1 Soil Sampling Methods - Soil samples were classified and logged during field drilling activities. The samples for chemical analyses were collected from the sampler according to procedures described below and in EM1110-1-4000 as well as in Sections 5 and 12 of Maxim's General Sampling Procedures Manual found in Appendix 4-1 of the QAPP. Samples for analysis for VOCs were collected first. Samples for the other analytical parameters were placed in a pre-cleaned stainless steel bowl and mixed with a stainless steel spoon. Sufficient sample was homogenized for the field sample, duplicate, and split samples. Samples were then placed into appropriate containers and then placed immediately on ice.

The soil samples were collected from intervals exhibiting evidence of contamination or representative strata.

4.2.1.2 Subsurface Drilling Methods and Equipment - Maxim performed all the necessary drilling and augering operations involved in sampling the six shallow hand auger sites and installing the ten temporary well points. Maxim provided the necessary drill rig unit, mounted on an all-terrain-vehicle (ATV), 4.25-inch I.D. hollow stem augers and 3-inch by 5 foot continuous sampler, 2-inch by 2-foot split-spoon sampler and associated support equipment and crew.

The rig was steam cleaned prior to arrival of the drill rig on site. Prior to the start of drilling activities, all rods, samplers, and associated sampling equipment were cleaned with deionized water (DI) and Alconox prior to their use at each boring location. All water used during decontamination was obtained from the water supply line located inside Building 1717. The water on-site is supplied through the City of Naperville which obtains its water from Lake Michigan. Toxic and/or contaminating substances were not used during any part of the drilling.

The Drill Rig operator was responsible for the inspection of his rig unit two weeks prior to arrival on-site to ensure the unit was in safe operating condition. After the rig was on-site, all safety criteria were again inspected by the operator.

When the auger and split-spoon method was used the augers were advanced to approximately 2 feet below the surface. The split-spoon was then attached to the drill rods and advanced two feet using a hydraulic hammer. The sampler was then removed and handed to the Maxim Site Manager for sample extraction and classification. The augers were advanced another two feet and another clean spit-spoon sampler was attached to the drill rods and advanced. After each sample was logged the split-spoon sampler was washed with an Alconox soap solution and rinsed with deionized water.

Throughout drilling, the borehole was continuously monitored with an Industrial Scientific TMX412 Multi-Gas Meter and an OVM 580B organic vapor monitor (OVM) as specified in the Health and Safety Plan. The soil sample was handed to the Maxim Site Geologist for sample extraction and classification. Soil samples obtained were visually classified by the on-site geologist using the Unified Soil Classification System. Classification of all materials and drilling operations was recorded and logged.

4.2.2 Groundwater Sampling from Temporary Well Points

Temporary well points rather than permanent groundwater monitoring wells were installed from December 9, 1996 through December 15, 1996 as a part of this investigation. Auger drilling methods were used to advance each borehole. Drilling and well point installation followed EM 1110-1-4000, dated August 31, 1994.

The temporary well points consisted of 10-foot sections of Schedule 40 PVC conforming to National Sanitary Foundation (NSF) Standard 14 with threaded, flush joints. The screen was factory-slotted (0.010 inch) Schedule 40 PVC, with a threaded well cap attached to the bottom. Solvent PVC glue was not used at any time in construction.

Once the borehole was drilled to the desired depth, the PVC well string was installed through the center of the hollow stem augers. The screened portion of the well string extended into the water table seven to ten feet and rested upon the bottom of the borehole.

4.2.2.1 Well Survey - The surveying of temporary well point (TWP) locations was performed by Weber, Hillemeier and Zuck, Inc., Registered Land Surveyors from Galesburg, Illinois. The field portion of the surveying at C-70 was performed on December 16, 1996. The state plane coordinates and ground elevation was measured at each of the temporary well points. The

elevations ranged from 736.76 at TWP-2 to 742.89 at TWP-8. The results of the survey are presented in a tabular format in Appendix C, along with a copy of the surveyor's filed notes.

4.2.2.2 Documentation - Logs detailing drilling and well construction practices were maintained for inclusion in the Engineering Report. The field boring logs were recorded on a HTRW Field Boring Log Form (Appendix D). Monitoring Well Installation Diagrams were not produced since only temporary wells were used. All of the boreholes drilled prior to the installation of the temporary well point were logged continuously from the surface to the termination of drilling. Generally, gravel (up to 2 " in diameter) was encountered at a depth of between 10 to 15 feet bgl. The size of the gravel prohibited sampling with a split spoon sampler. The borings were then sampled every five foot to verify the material being encountered. This method of sampling continued to approximately 40 feet when the rate of penetration of the augers changed, indicating a change in lithology. The sampler was again used to confirm the change in lithology or define the depth at which the strata changed.

Borehole logging complied with "Borehole Logging" established in EM 1110-1-400, August 31, 1994. The logs were prepared by the on-site Project Geologist. Information provided in the logs included, but was not limited to, the following:

- Reference elevation for all depth measurements
- Depth of each change of stratum
- Thickness of each stratum, including thin lenses and layers
- Identification of the material of which each stratum is composed according to the Unified Soil Classification System, or standard rock nomenclature, as applicable
- Depth interval from which each sample was taken - Depth at which groundwater is first encountered
- Total depth of temporary well point - Type of drilling equipment
- Type and size of samplers used
- Any sealing off of water-bearing strata
- Borehole diameter and depth hole diameter changes
- Description of temporary well screen, e.g. length, location, diameter, slot size, material, manufacturer
- Static water level upon completion of the temporary well point
- Drilling dates
- Manufacturer and quantities of all materials used
- Evidence of contamination, i.e., odors, photoionization detector measurements, staining, etc.

The primary objective of the drilling task was to identify and sample the uppermost aquifer at the site. Borings were terminated after the uppermost water-bearing unit was encountered and penetrated by 5 to 10 feet. The water bearing strata was penetrated enough to allow adequate sampling of the groundwater to occur.

All field activities were documented with photographs. Copies of relevant photographs are presented in Appendix B.

Water level measurements were obtained from each temporary well point using an electronic water level indicator. The probe end of the indicator was lowered through the PVC riser until water was encountered. The reference point was the ground surface. The procedures for collecting water level measurements was presented in Section 2 of Maxim's General Sampling Procedures Manual, Appendix 4-1 of the QAPP.

4.2.2.3 Sampling Methods for Groundwater - The temporary well point sampling was conducted immediately following installation without purging. Groundwater samples for VOCs and BTEX analyses were collected first during this activity, using a new disposable (dedicated), PVC bailer. After the VOC and BTEX samples were collected, the bailer was used to collect the SVOC and metals samples. The metals samples were filtered in the field using a Masterflex peristaltic pump to pump the sample through a 0.45 micron filter prior to preservation. Groundwater sampling is further described in Section 2 of Maxim's General Sampling Procedures Manual, Appendix 4-1 of the QAPP. A summary of the sample containers for each type of analyses can be found in Appendix 4-1 of the Field Sampling Plan (FSP) document and Section 5 of the QAPP document.

4.2.2.4 Decontamination Procedures - General decontamination protocols are presented in Appendix 4-1 of the QAPP (Section 11). All equipment was cleaned before arrival at the work site. All sampling and drilling equipment were decontaminated daily prior to collection of samples, between sample locations, and after use. Equipment was thoroughly washed with Liquinox and DI water and rinsed with deionized water. Deionized water was obtained from Maxim shipped to the field. All water generated from decontamination was allowed to soak into the ground surface. Decontamination equipment included plastic sheeting, buckets, brushes, DI sprayer, Alconox, tap water, and DI water.

4.2.2.5 Well/Borehole Closure and Abandonment - After sampling was completed at each temporary well point, the PVC well screen was removed from the center of the hollow stem augers. The hollow stem augers were also removed. No evidence of contamination was observed in the soil cuttings, so each borehole was backfilled with its own soil cuttings. A few boreholes needed additional backfill, 1/4-inch bentonite chips were used as supplemental backfill.

Approximately one month after drilling operations had been completed, the property owners at the 1717 Building and the Wass Consulting Group building contacted Maxim to inform us that the boreholes through the asphalt had subsided. The subsidence was probably caused by a phenomenon called "borehole bridging". Borehole bridging occurs when the backfill material (soil cuttings consisting of a sandy gravel, with the diameter of the gravel ranging from one to three inches) becomes lodged in the borehole forming a bridge of gravel, that prevent the movement of backfill down into the borehole. Sometime later, the effects of gravity and vibration cause the bridge to collapse, which results in backfill subsidence at the surface.

As a safety measure, Maxim temporarily repaired boreholes by filling them with sand, during a trip to the Chicago Area in January of 1997. Plans were then made to return to the site and make permanent repairs when the weather became warmer.

In May, Maxim returned to the Chicago Area and repaired the boreholes by plugging the hole with approximately 1.5 feet of concrete and placing a 0.5 foot thick plug of compacted asphalt at the surface. The asphalt was sealed with an asphalt sealer and painted if necessary.

4.3 Analytical and Physical Testing Methods

Analytical testing on the samples was performed by Maxim Technologies St. Louis laboratory and AScI Corporation of Dearborn, Michigan. Maxim's St. Louis laboratory is certified by the Army Corps of Engineers MRD laboratory for all the chemical analysis methods performed. AScI performed the X-Ray Fluorescence (XRF) screening analyses for arsenic, chromium and lead. The MRD laboratory does not provide certification for XRF analysis. Maxim's laboratory performed all other analyses, with the exception of the QA samples which were analyzed by the MRD laboratory.

Analytical methods are outlined in Table 4-1. Laboratory QA/QC procedures are contained in the QAPP.

4.3.1 Field Monitoring Analysis

4.3.1.1 OVM Monitoring - Field monitoring of oxygen levels, lower explosive limits, carbon monoxide, hydrogen sulfide and organic vapors were performed during all drilling, well point installation and sampling activities. Data from field monitoring was used to monitor possible hazardous conditions in the field and to provide general monitoring of potential contamination for sample collection. BTEX samples were collected at areas/depths that exhibited an elevated PID reading. Equipment was inspected on a daily basis and calibrated according to instrument manufacturer's specifications.

4.3.1.2 Metals XRF Analysis - Soil screening samples, collected from the temporary well point and hand auger locations, were shipped to AScI for X-ray fluorescence (XRF) analysis screening. The metals were screened for arsenic, chromium, and lead. The detection limits for the XRF analyses are presented in Table 4-2.

4.3.2 Confirmatory Laboratory Analysis

During the site investigation all confirmatory soil/sediment and groundwater samples were sent to the Maxim Laboratory for analysis. The analyses were conducted for RAS parameters for organics and inorganics. The level of laboratory QC effort for RAS parameters provided by the CRL/CLP is specified in the current statements of work (SOW/OLM01.1 for organic and SOW/ILMO01.0 for inorganic analyses for CLP). Tables 4-3 through 4-5 contain the quantitation levels for confirmatory samples in this Focused Site Investigation.

4.4 Sampling Program

4.4.1 Rationale for Soil Screening Locations (XRF)

The collection of samples from the TWP sites was performed using a phased approach. Initially three soil samples were collected at each of the ten sample sites and sent to ASci Environmental Survey Division (Dearborn, MI) for analysis of arsenic, chromium and lead by x-ray fluorescence (XRF). The soil samples were sent to ASci via overnight delivery. The soil samples were analyzed by XRF (with a 24-hour turn around time) and the results returned to Maxim's project manager shortly thereafter. The project manager utilized the results of the XRF analysis to select the single sample from each boring to be analyzed by Maxim laboratory.

During field activities samples were also screened utilizing a photo-ionization detector (PID) meter to detect organic vapor odors. The results of the PID screening were utilized by the project geologist to aid in the selection of samples for BTEX analyses at the Maxim laboratory in St. Louis, Missouri.

4.4.1.1 Rationale for Temporary Well Point (TWP) Locations - Soil and groundwater samples were collected from ten temporary well point locations. The locations of all of the TWPs were selected during the site visit (8/14/96) by representatives from Illinois EPA, Buffalo District USACE and Maxim. The locations were further defined in subsequent meetings by USACE and IEPA.

Locations, sample descriptions and rationale for selection of the well point locations are presented below and shown in Figure 4-1.

TWP-1 - TWP-1 was designated as the background well. This well is located near the southeast corner of the study area. This area was selected as background, based on information collected during a previous investigation. The groundwater gradient has now been determined to be towards the southeast. Therefore, collection of samples from the southeast corner of the site may not be representative of background conditions.

Three soil samples were collected for XRF screening for arsenic, chromium and lead analyses. As prescribed by the SOW, all three soil samples (B1001, B1002 and B1003) were selected for confirmatory analysis. The collection interval for each of the three soil samples was 1-2 feet, 2-3 feet and 40-41 feet below grade level, respectively. The on-site geologist selected the depth of each sample interval as representative of specific strata or based upon signs of potential contamination.

Groundwater samples collected from TWP-1 were analyzed for VOC, SVOC and dissolved metals. Total depth of the TWP-1 was 49.5 feet below grade level (bgl).

TWP-2 - TWP-2 was drilled northeast of the Storm Water Retention Pond B. The area where the well was placed, is believed to have been the former location of the Acid Storage Shed. This well was intended to encounter any soil or groundwater contamination that may have

resulted from the spillage at the Acid Storage Shed.

Three soil samples were collected for XRF analysis for arsenic, chromium and lead analyses. Upon receipt of the results from the XRF analyses, Maxim's Project Manager selected sample B1004 (14' to 16' bgl) for confirmatory analysis. The sample interval was selected because of its elevated chromium level of 72.9 ppm.

Groundwater samples for this location were collected and analyzed for dissolved metals and BTEX. Total depth of the well was 43 feet bgl.

TWP-3 - TWP-3 was drilled within the interior of the cul-de-sac at the end of Park Street. This well was in the area where there may have been a leach field that drained the Acid Neutralization Pit. This well was intended to encounter soil and/or groundwater contamination that may have resulted from a leach field that may have been located in the area.

Three soil samples were collected for XRF analysis of arsenic, chromium and lead. Upon receipt of the results from the XRF analyses, Maxim's Project Manager selected sample B1007 (2' to 4' bgl) for confirmatory analysis. The sample interval was selected because of its elevated chromium (61.3 ppm) and lead (21.9 ppb) levels.

Groundwater samples for this location were collected and analyzed for dissolved metals and BTEX. Total depth of the well was 40 feet bgl.

TWP-4 - TWP-4 was drilled at the edge of the parking lot, near the northwest corner of Building 1717. This well was believed to be somewhat downgradient of the location of the former Generator Building. There were usually underground diesel fuel tanks associated with a Nike Battery Generator Building. It was mentioned in the SOW (Section 1.1-Site History) that during construction of Building 1717 a crushed and buried underground fuel tank was found by the construction firm. This well was intended to encounter soil or groundwater contamination resulting from potential leaks or spills of diesel fuel from the tanks.

Three soil samples were collected for XRF analysis of arsenic, chromium and lead. Upon receipt of the results from the XRF analyses, Maxim's Project Manager selected sample B1011 (9' to 12' bgl) for confirmatory analysis. The sample interval was selected because of previously detected, elevated levels of As, Cr and Pb and because this sample replicated the field duplicate (B1043FD) collected at the same depth interval.

Groundwater samples from this well were analyzed for dissolved metals and BTEX. Total depth of the well was 45 feet bgl.

TWP-5 - TWP-5 was drilled at the western edge of the earthen berm, just south of the parking garage. During a previous investigation, total petroleum hydrocarbons were detected in monitoring well MW-1, along with elevated levels of arsenic, lead and chromium (in unfiltered samples). Well TWP-5 was strategically placed to investigate the possibility of groundwater contamination between the existing monitoring well (MW-1) and the former buildings. This well was also used to investigate the plume from a possible leach field from the Missile Assembly Building.

Three soil samples were collected for XRF analysis of arsenic, chromium and lead. Upon receipt of the results for the XRF analyses, Maxim's Project Manager selected sample B1015 (40' to 41' bgl) for confirmatory analysis. The sample interval was selected to provide another representative sample of the sand zone encountered at 40 feet bgl. The background sample (E1003), from TWP-1, was also sampled from the 40 to 41 foot interval.

Groundwater samples for this location were collected and analyzed for dissolved metals and BTEX. Total depth of the well was 45 feet (bgl).

TWP-6 - TWP-6 was drilled in the parking lot along the western side of Building 1717. This well was located potentially down gradient of the former Missile Assembly and Test Building. This well was placed to encounter any soil or groundwater contamination caused by activities that occurred at the Missile Assembly and Test Building, along with any petroleum plume emanating from the Generator Building.

Three soil samples were collected for XRF analysis of arsenic, chromium and lead. Upon receipt of the results from the XRF analyses, Maxim's Project Manager selected sample B1016 (4' to 5' bgl) for confirmatory analysis. The sample interval was selected because of its elevated chromium (55.2 ppm) and lead (14.3 ppm) levels.

Groundwater samples from this well were collected and analyzed for dissolved metals and BTEX. Total depth of the well was 45 feet (bgl).

TWP-7 - TWP-7 was drilled north of Building 1717, in the 10th parking space from the eastern edge of the parking lot. This well was placed in an area where there may have been a leach field that drained the Acid Neutralization Pit. The well was intended to encounter soil or groundwater contamination that may have resulted from a leach field.

Three soil samples were collected for XRF analysis of arsenic, chromium and lead. Upon receipt of the results of the XRF analyses, Maxim's Project Manager selected sample B1019 (3' to 5' bgl) for confirmatory analysis. The sample interval was selected because of its elevated arsenic (20.9 ppm) and chromium (60.9 ppm) levels.

Groundwater samples for this location were collected and analyzed for dissolved metals and BTEX. Total depth of the well was 41 feet (bgl).

TWP-8 and TWP-9 - The Wass Consulting Group building is in the general location of the former Ready Building. The Ready Building was possibly, but not confirmed to have been heated with fuel oil that was most likely stored in an underground storage tank. The wells were intended to encounter any heating oil fuel related contamination that may have originated from a probable fuel storage tank. Temporary wells TWP-8 and TWP-9 were installed near the Wass Consulting Group building.

TWP-8 was drilled at a site 11 feet west and 17 feet north of the northeast corner of the Wass Consulting Group building.

Three soil samples were collected for XRF analysis of arsenic, chromium and lead. Upon receipt of the results from the XRF analyses, Maxim's Project Manager selected sample B1022 (1.5' to 3.5' bgl) for confirmatory analysis. The sample interval was selected because of its elevated arsenic (21.9 ppm) and chromium (78.7 ppm) levels.

Groundwater samples collected from TWP-8 were analyzed for dissolved metals and BTEX. Total depth of the well was 55 feet (bgl).

TWP-9 was drilled in the parking lot, between the two parking lanes, 21 feet east of the curb, along the eastern edge of the building.

Three soil samples were collected for XRF analysis of arsenic, chromium and lead. Upon receipt of the results from the XRF analyses, Maxim's Project Manager selected sample B1026 (3.5' to 5.5' bgl) for confirmatory analysis. The sample interval was selected because of its elevated chromium (82.6 ppm) and lead (21.5) levels.

Groundwater samples collected from TWP-9 were analyzed for dissolved metals and BTEX. Total depth of the well was 55 feet (bgl).

TWP-10 - was drilled along the eastern side of the parking structure and south of Building 1717. This well was intended to encounter soil or groundwater contamination associated with any petroleum plume that may be emanating from the location of the former Generator Building.

Three soil samples were collected for XRF analysis of arsenic, chromium and lead. Upon receipt of the results from the XRF analyses, Maxim's Project Manager selected sample B1028 (6' to '8 bgl) for confirmatory analysis. The sample interval was selected because of its elevated arsenic (16 ppb), chromium (89.3 ppm) and lead (16.1) levels.

Groundwater samples from TWP-10 were collected and analyzed for dissolved metals and BTEX. Total depth of the well was 49 feet bgl.

4.4.2 Rationale for Hand Auger Locations

As specified in the SOW, soil samples were collected from six hand auger sampling locations. The locations were selected to provide information on the possibility of contamination of the near-surface soils. The sampling sites were chosen based upon: the results of previous investigations; aerial photographic interpretation; facility maps; locations of former buildings; topography; and hydrology. Locations, sample descriptions and rationale for selection of the hand auger locations are presented below and shown in Figure 4-1.

HA-1 HA-1 was designated as the background near-surface soil sample. This sample was collected from the eastern portion of the O'Connell property, near the earthen berm. The soils at this location were believed to be natural and should not have been impacted by the operation of the Nike Battery. This site should be representative of background soil conditions.

Two soil samples were collected for XRF analyses of arsenic, chromium and lead. Upon receipt of the results from the XRF analyses, Maxim's Project Manager selected sample HA1032 (2' to 3' bgl) to be analyzed for confirmatory analysis.

HA-2 through HA-6 These five hand auger locations were across the large earthen berm that is near the southern site boundary. Two of the sample sites (HA-4 and HA-5) were along the crest of the western half of the berm. The remaining three sample sites (HA-2, HA-3 and HA-6) were along the crest of the eastern half of the berm.

Two soil samples were collected from each of the five locations for XRF analyses of arsenic, chromium and lead. Upon receipt of the results from the XRF analyses, Maxim's Project Manager selected one of the two samples to be analyzed for confirmatory analysis. The samples selected for the five hand auger sites were: HA1034, HA1036, HA1038, HA1040 and HA1042, respectively. The collection depths for this group varied from 0-3 feet below grade level.

4.4.3 Surface Water Locations

One surface water sample was collected from a storm water retention pond A, which is near the northern end of the study area; and a second water sample was collected from a storm water retention pond B, which is located near the southern end of the study area.

The rationale for collecting the surface water samples is to determine if: 1) there are any contaminants in the ponds; and 2) could the type of contamination detected have been caused by activities at the former Nike Battery.

The surface water samples were collected from each pond using the grab method. This was accomplished by submerging the sample bottle in to the water and allowing the bottle to fill. The samples were collected in the appropriate containers and preserved accordingly. Sample numbers designated SW-059 and SW-060 were assigned to Pond A and Pond B, respectively.

The surface water samples were analyzed for total and dissolved metals (As, Cr and Pb), VOC, and SVOC. The analytical methods employed for these parameters are presented in Table 4-1.

4.4.4 Permanent Monitoring Wells

Three permanent monitoring wells, MW-1, MW-2 and MW-3 were installed in 1988. Arsenic, lead, chromium, and TPH were detected in the soils collected during the drilling of these wells and elevated levels of arsenic, chromium and lead were detected in the groundwater (unfiltered samples). The locations of these wells are shown in Figure 4-1.

One groundwater sample was collected from each of the three permanent monitoring wells. [A split and duplicate sample were also collected from MW-3.] The samples were collected to confirm previous results and provide additional information on possible groundwater contamination.

The groundwater samples, designated GW-055, GW-056 and GW-057 were collected and sent to the laboratory for analysis of dissolved metals, VOC and SVOC.

4.4.5 Public Water Supply Well

One groundwater sample was collected from the City of Naperville public water supply well No. 10, located approximately 2,000 feet west of the site. Well No. 10 is 223 feet deep and was installed in 1962. The City receives all of its drinking water from Lake Michigan and no longer uses Well No. 10 for public water supply. It is part of the back-up system. This well was sampled December 11, 1996 during a routine purging event conducted by the Naperville Public Works Department. Approximately 100,000 gallons of water was discharged from the well during the purging. The sample was collected from a spigot that had been installed in the pump discharge pipeline, expressly for sampling.

The water sample, GW-058 and its duplicate GW-063 were collected and sent to the laboratory to be analyzed for VOC, SVOC, total and dissolved metals (As, Cr and Pb).

4.4.6 Topographic Survey - The vertical and horizontal coordinates of the ground surface adjacent to each of the 10 temporary well points was surveyed by Weber Hillemeier & Zuck under subcontract to Maxim. Coordinates for the boreholes were established according to EM 1110-1-4000. Since the monitoring wells are only temporary, the surveying requirements for both the vertical and horizontal measurements were conducted to the nearest 0.10 foot.

Survey results, presented in a tabular format along with a map and the field notes, are included in Appendix C.

4.5 Sample Collection, Preservation, Transportation and Chain-of-Custody

4.5.1 Sample Collection

Samples for each media involved in this investigation were collected as described in Section 4.2. One deviation from the FSP was necessary due to field conditions. This deviation is described as follows:

Drilling was initiated at the TWP-5 location on 12/10/96. The rig drilled to a depth of 10 feet below grade where auger refusal occurred. The rig pulled the augers and moved the hole location approximately 7 feet east of the original location.

4.5.2 Sample Preservation

Water and soil samples, collected for this investigation were placed in pre-cleaned and pre-preserved containers. The samples were then placed on ice at the collection site immediately after collection. Ice was placed in sealable plastic bags prior to being placed in the cooler. The containers, preservation storage requirements for each analytical parameter are described in Tables 4-6 and 4-7. All samples were placed in insulated containers and the ice was replenished as necessary prior to shipment to Maxim's laboratory and to the CEMRD-L QA laboratory by overnight delivery service.

4.5.3 Transportation

Samples for laboratory chemical analysis were shipped by overnight carrier to the Maxim St. Louis laboratory.

A systems audit for this project consisted of collection and shipment of split samples for each analytical parameter to CEMRD-EP-LC. Split samples were shipped to:

Commander, U.S. Army Corps of Engineers
Missouri River Division Laboratory
Attn: CEMRD-ET-LC (Laura Percifield)
420 South 18th Street
Omaha, Nebraska 68102-2586

Soil samples for rapid screening for metals using X-Ray Fluorescence were shipped to:

ASCI Corporation
15300 Rotunda Drive, Suite 307
Dearborn, Michigan 48120

4.5.4 Sample Shipment

All samples were shipped by overnight courier delivery service to the appropriate laboratory (i.e. Maxim, AsCI, or CEMRD-L).

The receiving laboratories documented the condition of field samples upon receipt to the laboratory. This enables verification of numerous items including correct sample volumes, preservation applied, cooler temperature; chain of custody completeness and accuracy; and overall packaging techniques.

4.5.5 Chain-of-Custody

All sample sets were accompanied by a chain-of-custody record. When transferring possession of samples, the individual receiving the sample signed, dated, and noted the time that he/she received the samples on the chain-of-custody record. This chain-of-custody record documented transfer of custody of samples from the field investigator to another person, other laboratories, or other organizational units. Samples were properly packaged for shipment and delivered or shipped to the designated laboratory for analyses. Shipping containers were secured by using nylon strapping tape and custody seals. The custody seals were placed on the shipping containers so that they could not be opened without breaking the seals. The seals were signed and dated by the field investigator. All samples were accompanied by the chain-of-custody record. The U.S. Army Corps of Engineers (USACE) tracking number (# 4301) that is used in conjunction with the government QA sample shipment was written on the QA sample's chain-of-custody record. The original and one copy of the record was placed in a plastic bag taped to the inside lid of the secured shipping container. One copy of the record was retained by the field investigator or project leader. The original record was transmitted to the Project Manager after samples were accepted by the laboratory. This copy became a part of the project file. Receipts from air bills have been retained as part of the documentation of the chain-of-custody. The air bill number was recorded in the remarks section of the chain-of-custody record. Copies of the Chain-of-Custodies are included in with the data package (previously delivered to the USACE).

4.6 QA/QC Samples

4.6.1 QA Samples Sent to MRD Laboratory

Two groundwater samples GW-062 and GW-064 (field splits of samples GW-048 & GW-058) were collected from TWP-4 and Public Water Well #10 respectively. The samples were sent to the MRD laboratory for analyses. These samples collected from TWP-4 were analyzed for dissolved metals, and BTEX. These samples collected from Public Water Supply Well #10 were analyzed for VOC, SVOC, total and dissolved metals.

One split soil sample was sent to the MRD laboratory for analysis. Sample SB-044 (a split of field sample SB-011) was collected during the boring of TWP-4. The sample was analyzed for metals (As, Cr and Pb) and BTEX.

4.6.2 QC Samples

Groundwater matrix spike and matrix duplicate samples were collected as split samples and sent to the Maxim-St. Louis laboratory for analysis. Groundwater samples SW-059 MS and SW-059 MSD were analyzed for VOC, SVOC, total and dissolved metals (As, Cr and Pb).

Soil matrix spike and matrix duplicate samples SB-043 and SB-045 were analyzed for total metals (As, Cr and Pb) and BTEX.

4.7 Investigative Derived Wastes (IDW)

Investigation-derived wastes included drill cuttings, decontamination fluids, and personal protective equipment.

4.7.1 Soil Boring and Hand Augered Cuttings

The cuttings produced were continuously inspected by the Site Manager/Geologist. Visual inspection and PID organic vapor meter was used to evaluate potential presence of contamination. Drill cuttings did not exhibit any evidence of contamination (eg. organic vapor levels above background, presence of odors, stains, and/or free product). Based upon guidelines agreed upon with IEPA, the borehole cuttings were backfilled into their respective borehole after completion of sampling activities.

4.7.2 Purge Water

Purge water was only generated while collecting groundwater samples from the three permanent monitoring wells. Initially, purge water was collected into a bucket to measure volume. During purging activities, the water generated was monitored with a PID and a Hydrolab water quality meter. Since the purge water did not exhibit evidence of environmental contamination, it was allowed to soak back into the ground in the immediate area of the well.

4.7.3 Equipment Decontamination Water

Equipment decontamination water was inspected by the Site Manager as it was generated. Since the decontamination water did not exhibit evidence of environmental contamination, it was allowed to soak back into the ground in the general area where it was generated. The effluent was not allowed to run off into the sanitary or stormwater sewer system.

4.7.4 Disposal of Personal Protective Equipment (PPE)

PPE investigation derived waste included Tyvek and/or Saranex coveralls, disposable gloves and boot covers. Paper towels, plastic sheets, tubing, and trash bags also fell within this category.

The PPE and other wastes did not exhibit signs of contamination during site activities, therefore, they were disposed of on a daily basis in a suitable dumpster located on-site.

4.7.5 Field Laboratory Waste

Analysis of samples in the field did not occur. No field laboratory waste was generated during this project.

SECTION 5

5.0 PHYSIOGRAPHY, TOPOGRAPHY, GEOLOGY, HYDROLOGY, AND HYDROGEOLOGY

5.1 Physical Setting

5.1.1 Physiography

The former Nike Battery C-70 is located in the Eastern Lake Section of the Central Lowland Province of the Interior Plains. This area is characterized by maturely dissected, glacial cuestas, and lowland moraines, lakes, and lacustrine plains [7].

5.1.2 Topography

The original topography was relatively flat. The site has been altered greatly by the construction of the office park. Currently there are two small (< 1 acre) retention basins and a relatively large earthen berm. The earthen berm extends from Diehl Road southward along the eastern perimeter and along the southern border also. The eastern berm is six to eight feet high and 10 to 15 feet wide. The southern berm was augmented during the construction of the office park and it is much larger than the eastern berm, being 15 to 20 feet high and 30 to 40 feet wide. The topography of the study area ranges from an elevation of 731 feet to 754 feet above mean sea level.[8]

5.1.3 Regional Geology

The former C-70 Missile Battery is located in a region that is dominated by deep (50 to 150 feet) Pleistocene deposits. This unconsolidated glacially deposited material includes lake bed deposits, tills, outwash sands and gravels, and alluvial deposits [9]. The bedrock consists of Silurian Age limestone and Ordovician Age shales, limestone and sandstone.[10]

5.2 Site Geology, Hydrology and Hydrogeology

5.2.1 Site Geology

The geology at the site consists of silty clays interbedded with sands and gravels. This material is probably the Equality Formation. The Equality is characterized as lake and offshore deposits of silt and clay with sand and gravel facies near the shoreline [9,11]. The Dolton Member of the Equality Formation is probably the strata encountered in the project area.

A general description of the strata encountered is as follows: nine to fifteen feet of silty clay; over, 30 to 35 feet of sandy gravel (up to 3" in diameter); below the gravel was a medium sand (thickness unknown).

5.2.2 Hydrology

The West Branch of the DuPage River is approximately two miles west of the site. The pre-development drainage was probably toward the river, however, the construction of the office buildings and the large expanses of paved roads and parking lots have altered the natural surface drainage. Currently there are two storm water retention basins, one at each end of the office park to receive surface drainage.

5.2.3 Hydrogeology

Ground water was encountered during the drilling of all of the temporary well points (TWPs), at depths ranging from 34.1' to 48.4' bgl. The water level data collected from the TWPs is from unstabilized conditions, and can not be used for interpretation of the water level gradient. The water level data collected from the permanent monitoring wells is presented below. This data was collected during stabilized conditions and can be used to help determine the gradient of the local ground water.

Summary of Monitoring Well Elevations				
Well Number	Surface Elevation	TOC Elevation	Water Level Below TOC	Water Level Elevation
MW-1	731.08	730.61	30.75	699.86
MW-2	732.93	732.51	32.69	699.82
MW-3	737.56	736.88	36.65	700.23

The water level data from the three monitoring wells was used in the diagram presented in Figure 5-1 to determine the direction of groundwater flow. Based upon the diagram in Figure 5-1, it appears that the groundwater gradient is toward the southeast.

5.3 Groundwater Targets

The City of Naperville receives all of its drinking water from Lake Michigan. During an interview with Mr. Allan Poole, Director of Public Works for the City of Naperville, he stated that the City receives 100% of its drinking water from Lake Michigan. The City wells are for emergency supply only. The local ground water is not used as a source of drinking water.

The source of potable water is regulated by the local government. Supplement No. 9 of the City of Naperville Municipal Code, Chapter 3, Section 7-3-2 Para. 2, states that "All area within the Municipal limits and all area upon annexation shall be required to connect onto a public [water] system when available unless within a zoning district specifically allowing private wells."

USACE should follow the procedures presented in the Illinois EPA TACO Document (IAC 35) to determine the presence of local groundwater targets.

SECTION 6

6.0 REGULATORY CRITERIA USED FOR DATA EVALUATION

During the Focused Site Investigation at the former Nike Missile Battery, C-70 site, Maxim collected and analyzed environmental samples from a variety of media, including surface and subsurface soils, groundwater and surface water. The primary objectives associated with the collection of these samples were to characterize background soil and geologic conditions at the site; assess the nature and general extent of contamination; identify potential sources and migrational pathways for contamination; assess the nature and general extent of contamination; evaluate the potential for migration of contaminants to off-site receptors; provide a bases for determining the need for future investigations and/or remediation at the site; and provide a baseline data for risk assessment.

XRF screening of soils samples was used to assess the potential presence of elevated levels of As, Cr and Pb. Results of the XRF analyses are summarized in Section 7 of this report. The XRF screening method was used to identify potential hot spots, and as a basis for selection of samples for confirmation analysis in the laboratory. Screening samples are semi-quantitative and are not directly compared to regulatory criteria. They are also not to be used for risk assessment purposes.

Based upon the field screening results, the environmental samples from the screening areas were submitted for confirmatory laboratory analyses. Results of the confirmation sampling effort are summarized in Section 8 of this report. These data are compared to Tier 1 soil CUOs and background soil values for metropolitan areas presented in the IEPA TACO document, to assess if the concentration of chemical contamination at the site warrants further evaluation. Analytes which were detected in concentrations which exceed the most conservative regulatory criteria for each media are identified as "Preliminary Contaminants of Concern" (PCOC). These regulatory criteria are risk-based exposure limits for a variety of exposure pathways such as ingestion of soil or groundwater and inhalation of soil. In cases where an analyte was not detected at a concentration exceeding the most conservative regulatory criteria, the particular analyte was placed on a list proposed to be eliminated from further consideration during future site investigation or remediation activities. It is understood that IEPA will have to concur with any PCOC proposed for elimination before it is actually eliminated from future investigations.

As the first step in assessing the Nike C-70 chemical analytical results, Maxim compared the results to an appropriate standard for the purpose of screening the analytical results to create a preliminary list of COCs which may become targets for future site remedial actions. The regulatory standard was reviewed to assess its appropriateness to the Nike C-70 data. The standard reviewed was as follows:

- Tiered Approach to Corrective Action Objectives (TACO) Guidance Document, IEPA/BOL (IAC 35), (2/97)

Based on the initial review of available cleanup and remediation standards, it was assessed that the cleanup objectives (CUOs) presented in the Illinois TACO guidance document would be used to identify preliminary contaminants of concern (COCs). The TACO guidance document was selected for the evaluation of the C-70 data because it was developed by the regulatory agency

which will be reviewing project progress and approving project site investigation and remedial activities, and because the overall soil screening approach presented in the document follows both USEPA and ASTM soil screening framework.

The Illinois TACO guidance document focuses on a three-tiered approach to defining the cleanup criteria for impacted soil and groundwater. The three tiers associated with assessing soil cleanup objectives are defined as follows:

- Tier 1: The Tier 1 evaluation defines generic, risk-based soil screening levels published in tables within the TACO document. These generic values are calculated using default risk assessment values in the place of site-specific information. In addition, the Tier 1 evaluation assumes that receptors are located on the subject site and that the cancer risk associated with contaminant exposure is $10E-6$.
- Tier 2: The Tier 2 cleanup objectives (CUOs) are analytically calculated and produce a site-specific set of soil and groundwater cleanup concentrations. Calculations are made using a set of risk assessment formulas published in the TACO guidance document and site-specific data.
- Tier 3: The Tier 3 evaluation is defined as a risk and exposure assessment performed using detailed site information, probabilistic data analysis and COC fate and transport modeling.

Maxim used the Tier 1 evaluation to define preliminary CUOs for specific analytes. The Tier 1 approach was used since the project is in preliminary stages. For the purposes of the preliminary soil screening task, Maxim used Tier 1 - Residential Criteria and selected the lowest CUO for comparison with each analyzed compound.

During the regulatory evaluation of the Nike C-70 data, it was noted that CUOs were not defined in the TACO guidance document for every compound/element analyzed for in the chemistry laboratory. As specified in the TACO document, analytes for which exposure limits were not defined in TACO are compared with exposure limits defined in other risk-based screening documents, such as USEPA IX criteria. The data evaluation for each media is described in more detail in the following sections.

6.1 Regulatory Criteria Used for Soil Data Evaluation

Chemical contamination present in soil could potentially impact human health and the environment through exposure pathways such as inhalation, ingestion, and migration to non-contaminated soil and groundwater. Evaluation criteria initially evaluated for use to assess potential risks associated with detected soil contamination and to define preliminary contaminants of concern include:

- 1) Health risk criteria defined by regulatory agencies
- 2) Comparison of detected concentrations with on-site background levels, and
- 3) Comparison with background levels defined by IEPA as typical of Standard Metropolitan Statistical Areas.

Each of these data evaluation criteria are discussed below:

6.1.1 Health Risk Criteria Defined by Regulatory Agencies

Risk-based screening levels for metals (As, Cr, and Pb) are presented in Tables 6-1 through 6-3, respectively. Levels of contamination in soil above the cleanup objectives have been used to define potential contaminants of concern. As previously discussed, the most conservative residential scenario was used during the comparison of the Nike C-70 analytical data to the TACO Tier 1 cleanup objectives.

6.1.2 Comparison of Data With On-site Background Concentrations

During the confirmation sampling effort, Maxim collected three soil samples from a single borehole at three different depths and two soil samples from a single hand auger location at two different depths at the subject site, which were defined as site background samples. Results of the background soil samples collected are presented in Tables 8-1 and 8-2. As shown by the information presented in these referenced tables, the values for As, Cr and Pb, in the background samples, exceed the TACO Tier 1 CUOs; and two of the three metals (As and Cr) have exceeded the Background Levels in Soils from Metropolitan Areas (listed in TACO, Table G).

6.2 Regulatory Criteria Used for Groundwater Data Evaluation

Groundwater samples were collected from the ten temporary well points. Of these ten locations, one of them, TWP-1, was collected as a background sample. The environmental data generated from samples collected for VOCs, SVOCs and metals (As, Cr and Pb) are summarized in Tables 8-5 through 8-9, respectively. The primary source of the groundwater cleanup objectives presented in Tables 6-4 through 6-6 for specific analyte groups was the IEPA TACO document (2/97). In cases where the TACO guidance document did not present a cleanup objective for groundwater, other sources were consulted to define an appropriate groundwater cleanup standard.

If chemical compounds exceeded Tier 1 groundwater cleanup objectives (Class 1 Baseline) they were identified as a contaminant of concern (COC) for further consideration. As in the case with the soil results, any analyte which was not detected at concentrations exceeding the most conservative regulatory criteria, is not selected as a COC, and is proposed for elimination from further consideration. It is understood that the IEPA will have to concur with any COC proposed for elimination before it is actually eliminated from future investigations or remedial action.

A presentation and discussion of the results of the groundwater data evaluation is presented in Section 8 of this submittal.

SECTION 7

7.0 FIELD INVESTIGATION RESULTS

7.1 Soil Screening

Soil samples were collected from ten boreholes and six hand auger locations throughout the Nike C-70 Site. The samples were sent to ASci, Inc. for XRF analysis of As, Cr and Pb. Based on the results of the XRF analyses, one soil sample from each of the borehole/hand auger location was selected and analyzed for confirmation in the Maxim - St. Louis Laboratory. The results of the XRF screening are presented in Table 7-1.

During field activities, a PID instrument was utilized to identify any potential volatile organic compounds within the soils. All PID readings recorded ambient levels, except one reading of 50 ppm at borehole TWP-9 at a depth of approximately 4 feet bgl. This reading could not be reproduced and is believed to be a transient reading of unknown origin. No odors or staining were observed. The elevated reading may have been a result of the instrument reacting to the cold, damp weather conditions.

7.2 Soil Investigation Results

Ten boreholes [temporary well points, (TWPs)] and six hand auger (HA) locations were advanced to collect soil samples at the site. Locations of these temporary well points and hand auger locations are shown in Figure 4-1.

7.2.1 Soil Boring Samples

Initially three soil samples were collected at each of the ten TWP sample sites and were then shipped to ASci Environmental Survey Division (Dearborn, MI) for analysis of arsenic, chromium and lead by x-ray fluorescence (XRF). The results of these samples were sent to Maxim's project manager for review. The project manager selected a single sample from each boring for confirmatory analysis by Maxim's laboratory. For the background soil boring location (TWP-1), all three soil samples from this location were analyzed for XRF and confirmatory analysis.

A total of thirteen soil samples, which includes one duplicate sample, were collected from the ten TWP locations for analysis by Maxim's laboratory. Boring logs are included in Appendix D.

TWP-1 - This boring location was installed as the background well point, located in the southeast corner of the property. Sample SB-001 (1 - 2' bgl) was collected for BTEX analyses. Samples SB-001, SB-002, and SB-003 were sent to the XRF laboratory for analysis. The PID recorded ambient levels throughout, the boring of TWP-1.

TWP-2 - This boring location was installed northeast of Pond B and southeast of the Park Street cul-de-sac. Sample SB-004 (14 - 16' bgl) was collected for BTEX analyses. Three soil samples designated SB-004, SB-005 and SB-006 were sent to the XRF laboratory for analysis. The PID recorded ambient levels throughout, the boring of TWP-2.

TWP-3 - This boring location was installed within the interior of the cul-de-sac at the end of Park Street. Sample SB-008 (1 - 4' bgl) was collected for BTEX analyses. Three soil samples designated SB-007, SB-008 and SB-009, were sent to the XRF laboratory for analysis. The PID recorded ambient levels throughout, the boring of TWP-3.

TWP-4 - This boring location was installed at the edge of the parking lot, near the northwest corner of Building 1717. Sample SB-011 (9 - 12' bgl) was collected for BTEX analyses. Four soil samples designated SB-010, SB-011, SB-012 and SB-043 were sent to the XRF laboratory for analysis. The PID recorded ambient levels throughout, the boring of TWP-4.

TWP-5 - This boring was advanced at the western edge of the earthen berm, just south of the Building 1717 parking garage. Sample number SB-015 (40-41' bgl) was analyzed for BTEX. Three soil samples designated SB-013, SB-014, and SB-015 were sent to the XRF laboratory for analysis. The PID recorded ambient levels throughout, the boring of TWP-5.

TWP-6 - This boring location was advanced in the parking lot that is along the western side of Building 1717 approximately 100 feet southwest from boring TWP-4. Sample SB-016 (4 - 5' bgl) was collected for BTEX analyses. Three soil samples designated SB-016, SB-017 and SB-018 were sent to the XRF laboratory for analysis. The PID recorded ambient levels throughout the boring of TWP-6.

TWP-7 - This boring location was installed north of Building 1717, in the 10th parking space from the eastern edge of the parking lot. Sample SB-019 (3 - 5' bgl) was collected for BTEX analyses. Three soil samples designated SB-019, SB-020 and SB-021 were sent to the XRF laboratory for analysis. The PID recorded ambient levels throughout the boring of TWP-7.

TWP-8 - This boring location was installed northeast of the current Wass Consulting Group Building (previously Hawthorne Credit Union as stated in the FSP, now owned by Tri-Peak Investments, LLC). Sample SB-022 (1.5 - 3.5' bgl) was collected for BTEX analyses. Three soil samples SB-022, SB-023 and SB-024 were sent to the XRF laboratory for analysis. The PID recorded ambient levels throughout the boring of TWP-8.

TWP-9 - This boring location was installed approximately 21 feet east from the Wass Consulting Group Building. Sample SB-026 (3.5 - 5.5' bgl) was collected for BTEX analyses. As mentioned in section 7.1 above, the PID reading for this depth interval registered 50 ppm initially. However, this reading could not be reproduced. Samples SB-025, SB-026 and SB-027 were sent to the XRF laboratory for Analyses. The PID recorded ambient levels throughout the boring of TWP-9.

TWP-10 - This boring location was installed 35 feet east from Building 1717 Parking Garage and 30 feet south from Building 1717. Sample SB-028 (6 - 8' bgl) was collected for BTEX analysis. Three soil samples designated SB-028, SB-029 and SB-030 were sent to XRF laboratory for analysis. The PID recorded ambient levels throughout the boring of TWP-10.

7.2.2 Hand Auger Samples (Shallow Soil Samples)

Initially two soil samples were collected at each of the six hand auger locations and were shipped to AScl Environmental Survey Division (Dearborn, MI) for analysis of arsenic, chromium and lead by x-ray fluorescence. Upon receipt of the results from the XRF laboratory, the project manager selected a single sample from each boring for confirmation analysis by Maxim's laboratory. The results of the XRF screening are presented in Table 7-1.

All six hand auger locations were sampled by utilizing the drill rig to advance a 3" by 5' split tube sampler. Proper drill rig protocol and decontamination procedures were conducted between each hole.

The background location was HA-1. Since this was a background location two soil samples from this location were analyzed for XRF and confirmatory analysis by the Maxim laboratory. Thirteen soil samples were collected from the six HA locations. These are described below.

HA-1 - This sample was collected approximately 315 feet east from TWP-3 location on J.F. O'Connell property near the earthen berm. Samples numbered HA-31 & HA-32 were collected at a depth interval of 0-2 feet bgl & 2-3 feet bgl, respectively. HA-45 was field duplicate of sample HA-31. PID readings recorded ambient levels throughout the sampling.

HA-2 - This sample was collected from the top of the far-eastern portion of the southern berm, northwest from TWP-1 location. Sample HA-33 (2 - 3' bgl) was collected for BTEX analysis. Two soil samples (HA-33 & HA-34) were collected for XRF analyses. PID readings recorded ambient levels throughout the sampling.

HA-3 - This sample was collected from the top of the southern berm approximately 115 feet west from HA-2. Sample HA-36 (2 - 3' bgl) was collected for BTEX analyses. Two soil samples (HA-35 & HA-36) were collected for XRF analysis. PID readings recorded ambient levels throughout the sampling.

HA-4 - This sample was collected from the top of the southern berm approximately 195 feet west from HA-3. Sample HA-37 (1.5 - 3.5' bgl) was collected for BTEX analysis. Two soil samples (HA-37 & HA-38) were collected for XRF analysis. PID readings recorded ambient levels throughout the sampling.

HA-5 - This sample was collected from the top of the southern berm approximately 115 west from HA-4. Sample HA-39 (2 - 3' bgl) was collected for BTEX analysis. Two soil samples (HA-39 & HA-40) were collected for XRF analysis. PID readings recorded ambient levels throughout the sampling.

HA-6 - This sample was collected from the northern side of the southern berm approximately 70 feet northeast from HA-5. Sample HA-41 was collected for BTEX analysis. Two soil samples (HA-41 & HA-42) were collected for XRF analysis. PID readings recorded ambient levels throughout the sampling.

7.3 Groundwater Investigation Results

7.3.1 Results of Temporary Well Point Sampling

Ten temporary well points were installed in selected locations to collect samples of groundwater at the former C-70 site. Locations of these TWP's are shown in Figure 4-1. Boring logs forms are included in Appendix D.

Samples were collected using a new disposable PVC bailer for each TWP. The dissolved metals samples were field filtered using a Masterflex peristaltic pump connected to a new, disposable 0.45 micron filter. All the samples were packaged and transported directly to Maxim's laboratory via overnight express service. A Hydrolab portable water quality meter was used to monitor pH, conductivity, and temperature of the groundwater. Because of equipment malfunction the field water quality parameters were not measured at each TWP. A summary of the groundwater sampling data is presented in Table 7-2. The data that was collected is presented below.

TWP-1 - After groundwater was encountered at 39.0 feet bgl, drilling continued to 49.5 feet bgl. Groundwater sample GW-045 was collected for VOC, SVOC and dissolved metals (As, Cr and Pb). Field water quality parameters recorded: Temperature = (not recorded); pH = 7.1; Conductivity = 968; Turbidity = Very turbid.

TWP-2 - During drilling activities, groundwater was encountered at 30.3 feet bgl. The well was drilled to 43.0 feet bgl. A groundwater sample, designated GW-046, was collected for dissolved metals (As, Cr and Pb) and BTEX.

TWP-3 - During drilling activities, groundwater was encountered at 38.0 feet bgl. The well was drilled to 40.0 feet bgl. A groundwater sample, designated GW-047, was collected for dissolved metals (As, Cr and Pb) and BTEX. Field water quality parameters recorded: Temperature = 11.0; pH = 6.8; Conductivity = 156; Turbidity = Very turbid.

TWP-4 - During drilling activities, groundwater was encountered at 37.4 feet bgl. The well was drilled to 45.0 feet bgl. A groundwater sample, designated GW-048, was collected for dissolved metals (As, Cr and Pb) and BTEX. A duplicate sample designated GW-061 was also collected for the same parameters. Field water quality parameters recorded: Temperature = 12.1; pH = 6.8; Conductivity = 1480; Turbidity = Very turbid.

TWP-5 - During drilling activities, groundwater was encountered at 37.5 feet bgl. The well was drilled to 45.0 feet bgl. A groundwater sample, designated GW-049, was collected for dissolved metals (As, Cr and Pb) and BTEX. Field water quality parameters recorded: Temperature = 13.1; pH = 7.1; Conductivity = 166; Turbidity = Very turbid.

TWP-6 - During drilling activities, groundwater was encountered at 36.9 feet bgl. The well was drilled to 45.0 feet bgl. A groundwater sample, designated GW-050, was collected for dissolved metals (As, Cr and Pb) and BTEX. Field water quality parameters recorded: Temperature = 12.1; pH = 7; Conductivity = 171; Turbidity = Very turbid.

TWP-7 - During drilling activities, groundwater was encountered at 34.1 feet bgl. The well was drilled to 41.0 feet bgl. A groundwater sample, designated GW-051, was collected for dissolved metals (As, Cr and Pb) and BTEX. Field water quality parameters recorded: Temperature = 12.7; pH = 7.0; Conductivity = 1228; Turbidity = Very turbid.

TWP-8 - During drilling activities, groundwater was encountered at 43.6 feet bgl. The well was drilled to 55.0 feet bgl. A groundwater sample, designated GW-052 was collected for dissolved metals (As, Cr and Pb) and BTEX.

TWP-9 - During drilling activities, groundwater was encountered at 48.4 feet bgl. The well was drilled to 55.0 feet bgl. A groundwater sample, designated GW-053 was collected for dissolved metals (As, Cr and Pb) and BTEX.

TWP-10 - During drilling activities, groundwater was encountered at 36.2 feet bgl. The well was drilled to 49.0 feet bgl. A groundwater sample, designated GW-054 was collected for dissolved metals (As, Cr and Pb) and BTEX.

7.3.2 Groundwater Monitoring Well Results

Three permanent monitoring wells designated MW-1, MW-2 and MW-3, installed in 1988 on-site, were sampled as part of this investigation. Location of these three monitoring wells are shown in Figure 4-1. Prior to sampling of each well, water levels and total depth of the wells were measured and recorded. Each well was purged with a new disposable bailer of five times the standing well volume. A Hydrolab portable water quality meter was used to monitor pH, conductivity, and temperature of the groundwater at each well. The water quality parameters were recorded several times during purging activities. A summary of the parameters measured during the well sampling are presented in Table 7-3. The Hydrolab was calibrated at the beginning and at the end of each day it was used.

The volume of water purged, color, turbidity, and odor were noted in the Site Manager's bound notebook and the Well Monitoring Data Log (Appendix). All purge water was allowed to soak into the ground surface near the well since no evidence of contamination such as product, odor, or elevated PID readings was noted. Following purging, each well was sampled with a new disposable bailer. Sample numbers for each of the monitoring wells are designated GW-055, GW-056 & GW-057, respectively. The samples from each well were analyzed for VOC, SVOC and dissolved metals (As, Cr and Pb). The dissolved metals samples were field filtered using a Masterflex peristaltic pump connected to a new, disposable 0.45 micron filter.

7.3.3 Public Water Supply Well Results

Naperville Public Water Supply Well No. 10 was sampled to assess the water quality of a deeper aquifer. Well No. 10 is located approximately 2,000 feet west of the subject site. This well is 223 feet deep and was installed in 1962. The City receives all of its drinking water from Lake Michigan and no longer uses Well No. 10 for public water supply. This well is part of a back-up system. It is routinely purged throughout the year by the Naperville Public Works Department. Maxim sampled this well during one of the purging activities. Approximately 107,000 gallons of water were purged from the well prior to sampling. Sample number GW-058 was collected from Well No.10 and analyzed for VOC, SVOC, total and dissolved metals (As, Cr and Pb). A duplicate sample designated GW-063 was also collected from this well and was analyzed for the same parameters. A Hydrolab portable water quality meter was used to monitor pH, conductivity, and temperature of the groundwater during the purging of Well No. 10. A summary of the parameters measured during the well sampling are presented in Table 7-3.

7.3.4 Approximate Water Levels

Water levels were collected from each of the temporary well points and permanent monitoring wells using an electronic water level indicator. Table 7-2 lists the water levels measured during the installation of the temporary well points from 9 December 1996 through 15 December 1996.

7.4 Surface Water Investigation Results

One surface water sample was collected from each of two stormwater retention pond locations (Ponds A and B). The first surface water sample was collected from Pond A located near the northern section of the study area and on the western side of Park Street near the entrance to the Park Place of Naperville (Figure 4-1). The second surface water sample was collected from Pond B located immediately southeast from Building 1717.

The samples, designated SW-059 and SW-060, were collected by using the grab method. This was accomplished by submerging bottles into the body of water and allowing the bottle to fill. The samples were analyzed for VOC, SVOC, total and dissolved metals (As, Cr and Pb)

SECTION 8

8.0 ANALYTICAL LABORATORY RESULTS

8.1 Analytical and Physical Testing Results

This section refers to the series of tables which provide a summary of results for all analyses completed in the project. Soil results are reported in ug/Kg or mg/Kg, as noted in each table, and the liquid results are reported in ug/L or mg/L. Results are reported to the specified Project Quantitation Limits established in the Work Plans. Soils are reported on a dry weight basis.

Analytical results are presented in detail in the Analytical Data Package submitted as an electronic deliverable, under separate cover. The Data Package provides the complete record of results for each sample together with appropriate QC data, including case narratives for each Sample Delivery Group; results of analyses for each sample volatile, semi-volatiles, inorganics (total & dissolved metals), BTEX and other analytes (as required). QC results including lab blanks, trip blanks, matrix spike/matrix spike duplicates, results of standards analysis; daily laboratory quality control reports; and field and laboratory chain of custody forms. Specific laboratory analytical results are presented in this section and are grouped by sample type (e.g. soil and groundwater) and analytical fraction (e.g., volatiles, semi-volatiles, metals, BTEX, etc.)

8.1.1 Soil Samples

The following subsections include a summary and discussion of the analytical results of the soil samples collected at the former Nike Missile Battery C-70 site. Specific analyte groups reported for these soil samples included BTEX and metals (As, Cr and Pb) and pH.

8.1.1.1 Background Soil Samples - As specified in the Nike C-70 Field Sampling Plan (November 1996), background soil samples were collected from soil sample locations TWP-1 and HA-1. Analytical results which exceed the most conservative criteria of the Tier 1 Cleanup Objectives for Residential Soil (IEPA TACO Guidance Document, 2/97) for the VOC, SVOC and BTEX analyte groups are shaded in the tables. Analytical results for metals were compared to the average background levels found in a metropolitan area as presented in Table G of Appendix A, TACO guidance document.

To represent background conditions, Maxim collected three soil samples from a single borehole (TWP-1) and two soil samples from a single hand auger location (HA-1). Results of the background soil samples collected are presented in Tables 8.1 and 8.2. As shown by the information presented in the referenced tables, the values for As, Cr and Pb, in the background samples, exceed the TACO Tier 1 CUOs; and two of the three metals (As and Cr) have exceeded the Background Levels in Soils from Metropolitan Areas (listed in TACO, Appendix A, Table G). These values are shaded as can be seen in the tables listed above.

8.1.1.2 Building 1717 Area Soil Samples - Soil samples were collected from a variety of locations around Building 1717. A summary of the soil boring and soil samples collected from specific areas surrounding Building 1717 is as follows:

Location	Soil Boring ID	Soil Sample ID
Southern Berm Area	HA-2	HA-34
	HA-3	HA-36
	HA-4	HA-38
	HA-5	HA-40
	HA-6	HA-42
NE of Pond B	TWP-2	SB-004
NE of Bldg 1717	TWP-3	SB-007
NW of Bldg 1717	TWP-4	SB-011
	TWP-4	SB-043
S. of Pkg Garage	TWP-5	SB-015
W. of Bldg 1717	TWP-6	SB-016
N. of Bldg 1717	TWP-7	SB-019
S. of Bldg 1717	TWP-10	SB-028

Soil sample analyte concentrations which exceed the average background levels found in a metropolitan area (Appendix A, Table G, TACO) are listed below.

Metals: Soil samples collected from locations around Building 1717 were analyzed for the inorganic parameters of As, Cr, Pb and pH. As shown by the data presented in Table 8-3, 16 of the 19 soil samples including duplicates exceeded Background Levels for arsenic in soils in a Metro Area. Concentration of Arsenic ranged from 8.0 ppm to 15.1 ppm. Six of the 19 samples exceeded Background Levels for chromium in soils in a Metro Area. Concentration of chromium ranged from 18.7 ppm to 22.9 ppm. The concentrations of lead ranged from 4.1 to 25.9 ppm and did not exceed Background Levels for Soils in a Metro Area.

BTEX: Soil samples were also collected for BTEX. As shown by the data reported in Table 8-4, no soil samples analyzed for BTEX exceeded the Tier 1 Soil Cleanup Objectives.

pH: The pH measured in these soil samples ranged from 5.87 - 8.5 standard units. The pH values measured were within a range conducive with normal biological activity and no value measured exceeded the alkaline corrosive range (pH = 12.5).

8.1.1.3 Wass Consulting Group Building Soil Samples - Soil samples were collected from the Wass Consulting Building area. A summary of the soil boring and soil samples collected from this area is as follows:

Location	Soil Boring ID	Soil Sample ID
NE of Building	TWP-8	SB-022
E. of the Building	TWP-9	SB-026

Metals: Two soil samples collected from around the Wass Consulting Building and analyzed for metals (As, Cr and Pb). As shown by the data presented in Table 8-3, both soil samples exceeded Background Levels for arsenic in soils in a Metro Area. The concentrations of arsenic were 12.4 ppm & 8.8 ppm. One of the 2 samples exceeded Background Levels for chromium in soils in a Metro Area. The concentration of chromium was 19 ppm.

BTEX: Soil samples were also collected for BTEX analysis. As shown by the data reported in Table 8-4, no soil samples analyzed for BTEX exceeded the Tier 1 Soil Cleanup Objectives.

pH: The pH measured for these two soil samples were 8.5 & 8.29 standard units. The pH values measured were within a range conducive with normal biological activity and no value measured exceeded the alkaline corrosive range (pH = 12.5).

8.2 Groundwater Analytical Results

The following subsections presents a summary and discussion of the analytical results associated with the groundwater samples collected at the former Nike C-70 facility. The groundwater samples collected from the existing monitoring wells were analyzed for VOCs, SVOCs, and dissolved metals (As, Cr, & Pb). The groundwater samples collected from the temporary well points (TWPs) were analyzed for dissolved metals (As, Cr, & Pb) and BTEX. The groundwater samples collected from the Naperville water supply well No. 10 were analyzed for VOCs, SVOCs, and total and dissolved metals (As, Cr, & Pb).

8.2.1 Background Groundwater Results

One background groundwater sample (GW-045) was collected from TWP-1 and was analyzed for VOCs, SVOCs and dissolved metals. Discussion of the analytical results for the background samples for each specific analyte group is presented below. The results are also summarized in Tables 8-5, 8-6, and 8-7.

VOCs: There were no TCL VOCs detected in the samples collected from TWP-1. There were two library search compounds (long chain hydrocarbons) found at estimated concentrations of 14 and 32 ppb.

SVOCs: No TCL SVOCs exceeded the Tier 1 CUOs in the sample collected from GW-045. There were 30 library search compounds (mostly unknown alkanes) found at estimated concentrations ranging from 4 to 56 ppb.

Dissolved Metals (As, Cr & Pb): There were no dissolved metals detected in the sample from GW-45 that exceeded the Tier 1 CUOs.

8.2.2 Building 1717 Area Groundwater Results

The following paragraphs discusses the analytical results associated with the groundwater samples collected from the monitoring wells and TWP's installed around Building 1717. The results are also summarized in Tables 8-5 through 8-9.

8.2.2.1 Result of Temporary Well Point Samples

Dissolved Metals (As, Cr, & Pb): The only sample to exceed the Tier 1 CUOs was sample GW-048. This sample had a lead concentration of 10.4 ug/L. The Tier 1 CUO for lead is 7.5 ug/L.

BTEX: No BTEX compounds exceeded the Tier 1 Groundwater CUO.

8.2.2.2 Results of Existing Monitoring Well Samples - Discussion of the analytical results associated with the groundwater samples collected from the existing monitoring wells is presented below. The results are also summarized in Tables 8-5 through 8-9.

VOCs: None of the samples analyzed for VOCs exceeded the Tier 1 Groundwater CUOs.

SVOCs: None of the samples analyzed for SVOCs exceeded the Tier 1 Groundwater CUOs.

Dissolved Metals (As, Cr & Pb): None of the samples analyzed for dissolved metals (As, Cr and Pb) exceeded the Tier 1 Groundwater CUOs.

8.2.2.3 Wass Consulting Group Building Groundwater Results - Groundwater samples were collected from two temporary monitoring wells installed near the Wass Consulting Building area. A discussion of the analytical results associated with the groundwater samples collected from this area is presented below. The results are also summarized in Tables 8-5 through 8-9.

Dissolved Metals (As, Cr & Pb): None of the samples analyzed for dissolved metals exceeded the Tier 1 Groundwater CUOs.

BTEX: None of the samples analyzed for BTEX compounds exceeded the Tier 1 Groundwater CUOs.

8.2.2.4 Public Water Supply Well #10 Results - Groundwater sample GW-058 and its duplicate GW-63, were collected from the City of Naperville public water supply well #10. Discussion of the analytical results associated with the groundwater samples collected from this well is presented below. The results are also summarized in Tables 8-5 through 8-9.

VOCs: None of the samples analyzed for VOCs exceeded the Tier 1 Groundwater CUOs.

SVOCs: One SVOC compound exceeded the Tier 1 Groundwater CUOs. The compound bis(2-Ethylhexyl)phthalate was detected at 32 ug/L. The Tier 1 CUO for this compound is 6 ug/L. However, this compound is a common organic laboratory contaminant. Since the compound was not detected in the duplicate sample, it is most likely a laboratory contaminant.

Total Metals (As, Cr & Pb): None of the samples analyzed for total metals exceeded the Tier 1 Groundwater CUOs.

Dissolved Metals (As, Cr & Pb): None of the samples analyzed for dissolved metals exceeded the Tier 1 Groundwater CUOs.

8.2.2.5 Pond A & B Surface Water Results - Surface water samples were collected from Pond A and B locations. Discussion of the analytical results associated with these surface water samples are presented below. The results are also summarized in Tables 8-5 through 8-9.

VOCs: None of the samples analyzed for VOCs exceeded the Tier 1 Groundwater CUOs.

SVOCs: The SVOC results for the sample from Pond A (SW-059) did not exceed any of the Tier 1 Groundwater CUOs. The results of the SVOC analysis of the sample from Pond B (SW-60) did not exceed any Tier 1 CUOs. However one TCL compound (4-nitrophenol) was detected at a concentration of 3.3 ug/L. There is no Tier 1 cleanup objective associated with this compound.

Total Metals (As, Cr & Pb): None of the samples (from Pond A or B) analyzed for total metals exceeded the Tier 1 Groundwater CUOs.

Dissolved Metals (As, Cr & Pb): None of the dissolved metals samples analyzed exceeded the Tier 1 Groundwater CUOs.

8.3 Comparison of Screening (XRF) and Confirmatory (Lab) Sampling Results

The results of the XRF analyses were used to select a sample from each boring to be analyzed at the Maxim laboratory for confirmation. The purpose of this section is to present the comparison of XRF screening results with its related confirmatory samples. The specific analytes are the metals As, Cr, and Pb. Table 8-10 presents a comparison of each sample by analyte.

In general the XRF results and the laboratory results for arsenic and lead are relatively similar. The XRF and laboratory results for chromium differ greatly.

SECTION 9

9.0 SITE INVESTIGATION CONCLUSIONS

In this section of the submittal, Maxim will present a summary of the preliminary contaminants of concern (COCs) detected in the samples collected during site investigation activities at the former Nike C-70 site. For the purposes of the data evaluations discussed in this section, preliminary contaminants of concern (COC) are analytes which exceed applicable criteria as defined in the IEPA TACO guidance document.

9.1 Identification of Contaminants of Concern

Environmental samples (soil, groundwater and surface water) were collected from two different areas on-site and one off-site location to assess whether chemical contamination exists and if so, to what extent. Also, this investigation was conducted to identify if contamination was related to past facility activities. The areas where samples were collected included:

- Building 1717 (Former Launch Area)
- Wass Consulting Group Building (Former Ready Building)
- Public Water Supply Well #10

Discussion of the COCs within the soil and groundwater associated with these areas is presented in subsequent paragraphs of this section.

9.1.1 Preliminary Contaminants of Concern Within the Soils

Preliminary contaminants of concern within the soils will be identified and discussed in this subsection. The results are compared to soil CUOs and soil background levels presented in the IEPA TACO guidance document. The soils background levels presented in the TACO appear to be the more relevant criteria to evaluate the data generated during this investigation.

9.1.1.1 Preliminary COCs Identified At Building 1717 Area - As shown by the information presented in Table 8-3, concentrations of arsenic exceeded the Tier 1 Soil CUOs in all 19 samples within this area. All but two samples exceeded the background soil levels found in Illinois metropolitan areas (Appendix A, Table G, IEPA TACO). However, none of the samples exceeded the pH Specific Soil Remediation Objectives for inorganics for the migration to Groundwater portion of the Groundwater Ingestion Route (Class 1 Groundwater) which is presented in the TACO (Section 742-Appendix B, Table C).

Concentrations of chromium exceeded the Tier 1 Soil CUO in all 19 samples within this area. Only five samples (HA-32, HA-40, HA-42, SB-001 & SB-002) exceeded the background soil levels found in Illinois metropolitan areas. However, none of the values exceeded the pH Specific Soil Remediation Objective (Class 1 Groundwater).

Concentrations of lead exceeded the Tier 1 Soil CUOs in all 19 samples within this area. None of the samples exceeded the background soil levels found in Illinois metropolitan areas. However, none of the values exceeded the pH Specific Soil Remediation Objective (Class 1 Groundwater).

As presented in Table 8-4, no samples within this area exceeded BTEX compound levels for the Tier 1 Soil CUOs (Class 1).

Levels of pH for all the samples ranged from 5.87 in sample SB-001 to 8.5 in sample SB-003.

9.1.1.2 Preliminary COCs Identified At the Wass Consulting Group Building (Former Ready Building) - As shown by the information presented in Table 8-3, concentration of arsenic exceeded Tier 1 Soil CUOs in both samples (SB-022 & SB-026) within this area. Both samples also exceeded the background soil levels found in Illinois metropolitan areas. However, neither one of the samples exceeded the pH Specific Soil Remediation Objectives (Class 1 Groundwater).

Concentrations of chromium exceeded the Tier 1 Soil CUOs in both of the samples within this area. Whereas, only sample TWP-8 exceeds the background soil levels found in Illinois metropolitan areas. Also, neither one of the samples exceeded the pH Specific Soil Remediation Objectives (Class 1 Groundwater).

Concentrations of lead exceeded the Tier 1 Soil CUO in both samples collected from this area. Neither one of the samples exceeded the background soil levels found in Illinois metropolitan areas.

Levels of pH for the soil samples were 8.5 and 8.29, exceeding the range listed on Table C, Appendix B of the TACO. To compensate for the limitations of Table C, the IEPA has directed the USACE to use remediation objectives listed in the pH 7.75 - 8.0 for the pH range 8.0 - 9.0.

Neither sample collected from this area exceeded the Tier 1 soil CUOs for BTEX, compounds.

9.1.2 Preliminary Contaminants of Concern Within the Groundwater

During field activities, groundwater samples were collected from temporary and permanent monitoring well near Building 1717, temporary wells at the Wass Consulting Group Building, and Public Water Supply Well #10. Depending on the area, samples were analyzed for VOCs, SVOCs, dissolved and total metals (As, Cr, & Pb) and BTEX. The preliminary COCs identified from these analytical results are discussed in subsequent paragraphs of this section.

9.1.2.1 Preliminary COCs Identified in Groundwater from the Building 1717 Area - As presented in Tables 8-5 through 8-9, concentrations of VOCs, SVOCs, dissolved metals (As, Cr and Pb) and BTEX compounds did not exceed the Tier 1 Groundwater criteria in any of the samples collected from this area. Therefore, none of these analytes were identified as preliminary COCs. However, there were VOC and SVOC library search compounds found at

low levels in all of the samples. The VOC library search compounds were predominantly unknown compounds, with some unknown hydrocarbons and hydrocarbon related compounds at estimated values ranging from 5 to 32 ppb. The SVOC library search compounds are also predominantly unknown compounds along with hydrocarbon related compounds at estimated values ranging from 0.9 to 56 ppb. None of the library search compounds are addressed in the TACO.

9.1.2.2 Preliminary COCs Identified in Groundwater from the Wass Consulting Group Building (Former Ready Building) Area - As shown by the information presented in Tables 8-5 through 8-9, concentrations of dissolved metals (As, Cr & Pb) and BTEX did not exceed the Tier 1 Groundwater criteria for samples collected from this area. Therefore, none of these analytes were identified as preliminary COCs.

9.1.2.3 Preliminary COCs Identified at the Public Water Supply Well #10 Groundwater - As presented in Tables 8-5 through 8-9 concentration of VOCs, SVOCs, total and dissolved metals (As, Cr & Pb) did not exceed the Tier 1 Groundwater criteria in sample GW-058. However, duplicate sample GW-063 did exceed this criteria in SVOCs for bis(2-Ethylhexyl)phthalate which had a concentration level = 32 ug/L. The Tier 1 Groundwater criteria for this compound is 6 ug/L. The compound bis(2-Ethylhexyl)phthalate is a common laboratory contaminant and when detected at this level it is probably a laboratory artifact. There were VOC and SVOC library search compounds found at low levels in the samples. The VOC library search compounds consisted of hydrocarbons and hydrocarbon related compounds at estimated values ranging from 6 to 18 ppb. The SVOC library search compounds are also predominantly unknown compounds along with hydrocarbon related compounds at estimated values ranging from 0.3 to 21 ppb. None of the library search compounds are addressed in the TACO.

9.1.3 Preliminary Contaminants of Concern Within Surface Water

During field activities, surface water samples were collected from Ponds A and B. Samples were analyzed for VOCs, SVOCs, total and dissolved metals (As, Cr, & Pb). The preliminary COCs identified from these analytical results are discussed in subsequent paragraphs below.

9.1.3.1 Preliminary COCs Identified at Pond A Area Surface Water - As presented in Tables 8-5 through 8-9, concentrations of VOCs, SVOCs, total and dissolved metals (As, Cr & Pb) did not exceed the Tier 1 Groundwater criteria in sample SW-059. Therefore, none of these analytes were identified as preliminary COCs. There were SVOC library search compounds found at low levels in the samples. The SVOC library search compounds were predominantly unknown compounds along with hydrocarbon related compounds at estimated values ranging from 0.4 to 23 ppb. None of the library search compounds are addressed in the TACO.

9.1.3.2 Preliminary COCs Identified at Pond B Area Surface Water - As presented in Tables 8-5 through 8-9, concentrations of VOCs, SVOCs, total and dissolved metals (As, Cr &

Pb) did not exceed the Tier 1 Groundwater criteria. An SVOC compound, 4-Nitrophenol, was detected at 3.3 ug/L (the detection limit) in sample SW-060. The IEPA TACO does not reference a Tier 1 Groundwater criteria for this compound. There were SVOC library search compounds found at low levels in the samples. The SVOC library search compounds were predominantly unknown compounds along with hydrocarbon related compounds at estimated values ranging from 0.4 to 15 ppb. None of the library search compounds are addressed in the TACO.

9.1.4 Evaluation of the Analyses of the Rinsate & Travel Blank Samples

During field activities, one rinsate (RS-1) and two travel blank (TB1 & TB2) samples were collected for this project. RS-1 was a soil sampling equipment rinsate, analyzed for VOCs, SVOCs and dissolved metals (As, Cr, and Pb). There were no metals detected in the sample, and no TCL VOCs or SVOCs were detected.

TB1 and TB2 were analyzed for VOCs only. The data is presented in Table 8-5. There were no TCL VOC compounds detected in the travel blanks. (Methylene Chloride was detected in both samples at 4 ug/l, a probable laboratory artifact.) One library search compound was found in TB-1 and nine were found in TB-2. The interpretation of the data indicates that TB-2 was somehow contaminated by a hydrocarbon.

9.2 Summary of Results

9.2.1 Groundwater

The only indications of groundwater contamination detected at the site are the VOC and SVOC library search compounds found at low levels in all of the samples.

The VOC library search compounds are predominantly hydrocarbon related compounds at estimated values ranging from 5 to 32 ppb. The SVOC library search compounds are also predominantly hydrocarbon related compounds at estimated values ranging from 0.9 to 56 ppb.

9.2.2 Soils

The metals were found at levels above the Tier 1 CUOs and above the average background level for soil in a metropolitan area (Appendix A, Table G, IEPA TACO). The levels of these metals found in the upper strata (0 to 16' bgl) were relatively consistent throughout the site. The results of the background soils samples are comparable with the results of the samples from the two areas of concern.

The results of the soil samples collected from the lower strata at 40 to 41 feet bgl exhibit metals values an order of magnitude lower than the soil samples collected from the upper strata. This data from the lower strata and the data from the groundwater samples indicate that the metals in the upper zone are not migrating downward into the water bearing zone.

SECTION 10

10.0 RECOMMENDATIONS

The USACE should follow the Tiered Approach procedures presented in the TACO (35 IAC) document for closure of the site.

REFERENCES

- [1] Chicago Tribune, May 8, 1955. Retrieved from Chicago Historical Society Reference Library, Clark Street at North Avenue, Chicago, IL.
- [2] Scope of Work, Focused Site Investigation, Former Nike Battery C-70, Naperville, IL, Project #E05IL002701.
- [3] Contamination Evaluation of the Former Nike Missile Battery C-70, Naperville, Illinois prepared by IT Corporation, 1991.
- [4] Naperville Chamber of Commerce.
- [5] World Book Encyclopedia, 1996.
- [6] Chicago Tribune, March 11, 1954. Retrieved from Chicago Historical Society Reference Library.
- [7] Physical Divisions of the United States, USGS, 1964.
- [8] Interim Grading Plan, Park Place of Naperville, SDI Consultants, Ltd. 1985.
- [9] Quaternary Deposits of Illinois. Illinois State Geological Survey, 1979.
- [10] Geologic Map of Illinois. Illinois State Geological Survey, 1967.
- [11] Pleistocene Stratigraphy of Illinois. Willman and Frye. Illinois State Geological Survey Bul. 94, 1970.

USEPA QUALIFIERS FOR ANALYTICAL RESULTS

ORGANIC COMPOUND QUALIFIERS

- U = Indicates compound was analyzed for but not detected.
- J = Indicates an estimated value.
- N = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds.
- P = This flag is used for a pesticide/Aroclor target analyte where there is greater than 25% difference for detected concentrations between the two GC columns.
- C = This flag applies to pesticide results where the identification has been confirmed by GC/MS.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- E = This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis.
- D = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- A = This flag indicates that a tentatively identified compound (TIC) is a suspected aldol-condensation product.
- X = Other specific flags may be required to properly define the results. If used, they must be fully described and such description attached to the Sample Data Summary Package and the SDG Narrative.

INORGANIC COMPOUND QUALIFIERS

- C = Concentration qualifier - Enter "B" if the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL). If the analyte was analyzed for but not detected, a "U" must be entered.
- Q = Qualifier - Specified entries and their meanings are as follows:
 - E = The reported value is estimated because of the presence of interference.
 - M = Duplicate injection precision not met.
 - N = Spiked sample recovery not within control limits.
 - S = The reported value was determined by the Method of Standard Additions (MSA).
 - W = Post-digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.
 - * = Duplicate analysis not within control limits.
 - + = Correlation coefficient for the MSA is less than 0.995.

TABLE 4-1**ANALYTICAL METHODS*****CONFIRMATORY SOIL AND BACKGROUND SOIL**

Arsenic	3050A/7060A
Lead	3050A/7421
Chromium	3050A/6010A
BTEX	5030A/8020A
pH	9040A

GROUNDWATER AND SURFACE WATER

<u>Analyte</u>	<u>Digestion/Extraction</u>	<u>Analysis</u>
Arsenic (total)	3020A	7060A
Arsenic (dissolved)	3005A	6010A
Chromium (total)	3010A	6010A
Chromium (dissolved)	3005A	6010A
Lead (total)	3020A	7421
Lead (dissolved)	3005A	6010A
BTEX	5030A	8020A
VOA	5030A	8260B
SVOA (BNA)	3520B	8270B

SCREENING SAMPLES

Volatiles	HNU/PID Head Space
Metals (soil)	XRF

*The most recently promulgated versions of the methods cited above will be used unless otherwise instructed.

Note: All samples for dissolved metals will be field filtered prior to preservation. It is permissible to screen samples for selenium, arsenic, lead, and thallium by ICP and not run by AA if the levels found are sufficiently greater than the IDL.

TABLE 4-2	
ELEMENTAL SCREENING METHOD DETECTION LIMITS (ug/g)	
Element	MDL
Silver (Ag)	2
Arsenic (As)	*
Barium (Ba)	9
Bromine (Br)	4
Calcium (Ca)	0.01%
Cadmium (Cd)	2
Chromium (Cr)	15
Copper (Cu)	5
Iron (Fe)	100
Mercury (Hg)	4
Potassium (K)	0.02%
Manganese (Mn)	15
Nickel (Ni)	15
Lead (Pb)	5
Selenium (Se)	5
Antimony (Sb)	2
Titanium (Ti)	27
Zinc (Zn)	7

*LOD variable; <5 ug/g DW if Pb/As = 1; >50 ug/g DW if Pb/As = 10

TABLE 4-3
ESTIMATED PROJECT QUANTITATION LIMITS (PQL)
FOR FUDS SI'S IN ILLINOIS
VOLATILES TARGET COMPOUND LIST (TCL)

prb

Compound	CAS Number	Limits *	
		(ug/l)	(ug/kg)
1. Chloromethane	74-87-3	3.2	3.2
2. Bromomethane	74-83-9	3.6	3.6
3. Vinyl Chloride	75-01-4	2.0	2.0
4. Chloroethane	75-00-3	3.9	3.9
5. Methylene Chloride	75-09-2	2.4	2.4
6. Acetone	67-64-1	10.0	10.0
7. Carbon Disulfide	75-15-0	4.8	4.8
8. 1,1- Dichloroethene	75-35-4	3.2	3.2
9. 1,1- Dichloroethane	75-34-3	2.4	2.4
10. 1,2-Dichloroethene (Total)	540-59-0	2.4	2.4
11. Chloroform	67-66-3	1.8	1.8
12. 1,2-Dichloroethane	107-06-2	2.8	2.8
13. 2-Butanone	78-93-3	10.0	10.0
14. 1,1,1-Trichloroethane	71-55-6	3.0	3.0
15. Carbon Tetrachloride	56-23-5	4.3	4.3
16. Bromodichloromethane	75-27-4	2.7	2.7
17. 1,2-Dichloropropane	78-87-5	1.6	1.6
18. cis-1,3-Dichloropropene	10061-01-5	1.0	1.0
19. Trichloroethene	79-01-6	2.8	2.8
20. Dibromochloromethane	124-48-1	2.0	2.0
21. 1,1,2-Trichloroethane	79-00-5	2.2	2.2
22. Benzene	71-43-2	1.8	1.8
23. trans-1,3-Dichloropropene	10061-02-6	1.0	1.0
24. Bromoform	75-25-2	0.20	0.20
25. 4-Methyl-2-pentanone	108-10-1	11.0	11.0
26. 2-Hexanone	591-78-6	7.6	7.6
27. Tetrachloroethene	127-18-4	3.3	3.3
28. Toluene	108-88-1	7.4	7.4
29. 1,1,2,2-Tetrachloroethane	79-34-5	2.4	2.4
30. Chlorobenzene	108-90-7	2.0	2.0
31. Ethyl Benzene	100-41-4	2.0	2.0
32. Styrene	100-42-5	2.5	2.5
33. Xylenes (Total)	1330-20-7	3.1	3.1

* Limits will be corrected for dilution and/or percent moisture.

Analytical Method Number: 8260 A

Method Reference: USEPA SW 846 revision 3, with updates II and II B, July 1992

Maxim Technologies has established annual Method Detection Limits (MDLs) for 1996 in accordance with 40 CFR Part 136 and Maxim Technologies' Quality Assurance Plan. These MDLs are statistically determined limits established using blank reagent water and sodium sulfate and may not reflect what is achievable in site-specific investigative sample matrices. All data will be reported to the MDL and corrected for dilution and percent moisture where appropriate.

Prepared by: Buffalo District COE, Jan 1996

TABLE 4-4
ESTIMATED PROJECT QUANTITATION LIMITS (PQL)
FOR FUDS SI'S IN ILLINOIS
SEMIVOLATILE ORGANIC TARGET COMPOUND LIST (TCL)

Compound	Cas Number	Limits *	
		(ug/l)	(ug/kg)
1. Phenol	108-95-2	1.5	44
2. bis(2-Chloroethyl) ether	111-44-4	1.2	40
3. 2 Chlorophenol	95-57-8	4.3*	49
4. 1,3 Dichlorobenzene, (meta)	541-73-1	3.3*	100
5. 1,4 Dichlorobenzene, (para)	106-46-7	3.3*	94
6. 1,2-Dichlorobenzene, (ortho)	95-50-1	3.0*	94
7. 2-methylphenol	95-48-7	5.0*	232*
8. 2,2'-oxybis (1-Chloropropane)	108-60-1	1.2	39
9. 4-Methylphenol	106-44-5	4.5*	230*
10. N-Nitroso-di-n-propylamine	621-64-7	1.2	81*
11. Hexachloroethane	67-72-1	4.3	140
12. Nitrobenzene	98-95-3	1.4	48
13. Isophorone	78-59-1	1.7	57
14. 2-Nitrophenol	88-75-5	4.5*	281*
15. 2,4-Dimethylphenol	105-67-9	6.8*	192*
16. bis(2-Chloroethoxy)methane	111-91-1	1.0	34
17. 2,4-Dichlorophenol	120-83-2	4.1*	219*
18. 1,2,4 Trichlorobenzene	120-82-1	2.7	89
19. Naphthalene**	91-20-3	1.1	37
20. 4-Chloroaniline	106-47-8	2.5	82
21. Hexachlorobutadiene	87-68-3	4.5*	150
22. 4-Chloro-3-methylphenol	59-50-7	3.7*	184*
23. 2-Methylnaphthalene	91-57-6	1.4	46
24. Hexachlorocyclopentadiene	77-47-4	8.3*	164
25. 2,4,6-Trichlorophenol	88-06-2	3.4*	187* %
26. 2,4,5 Trichlorophenol	95-95-4	3.9*	200*
27. 2-Chloronaphthalene	91-58-7	1.4	47
28. 2- Nitroaniline	88-74-4	2.8	92
29. Dimethylphthalate	131-11-3	1.0	35
30. Acenaphthylene**	208-96-8	1.4	21
31. 2,6-Dinitrotoluene	606-20-2	0.8	47*
32. 3-Nitroaniline	99-09-2	2.8	139*
33. Acenaphthene**	83-32-9	1.3	43
34. 2,4-Dinitrophenol	51-28-5	4.5	231* %
35. 4-Nitrophenol	100-02-7	3.3*	140*
36. Dibenzofuran	132-64-9	1.2	41
37. 2,4-Dinitrotoluene	121-14-2	1.5	116*
38. Diethylphthalate	84-66-2	0.8	25
39. 4-Chlorophenyl-phenyl ether	7005-72-3	0.8	28
40. Fluorene**	86-73-7	1.0	34

TABLE 4-4
ESTIMATED PROJECT QUANTITATION LIMITS (PQL)
FOR FUDS SI'S IN ILLINOIS
SEMIVOLATILE ORGANIC TARGET COMPOUND LIST (TCL)

Compound	Cas Number	Limits *	
		(ug/l)	(ug/kg)
41. 4-Nitroaniline	100-01-6	7.6	250*
42. 4,6-Dinitro-2-methylphenol	534-52-1	4.1	210*
43. N-nitrosodiphenylamine	86-30-6	1.8*	35
44. 4-Bromophenyl-phenylether	101-55-3	1.0	34
45. Hexachlorobenzene	118-74-1	0.9*#	27
46. Pentachlorophenol	87-86-5	2.9*#	253* %
47. Phenanthrene**	85-01-8	0.7	23
48. Anthracene**	120-12-7	1.2	39
49. Carbazole	86-74-8	2.1	69
50. Di-n-butylphthalate	84-74-2	1.1	36
51. Fluoranthene**	206-44-0	1.0	35
52. Pyrene**	129-00-0	1.2	41
53. Butylbenzylphthalate	85-68-7	1.3	43
54. 3,3'-Dichlorobenzidine	91-94-1	4.6*	142* %
55. Benzo(a)anthracene**	56-55-3	0.56	19
56. Chrysene**	218-01-9	1.1	36
57. bis(2-Ethylhexyl)phthalate	117-81-7	3.6*	43
58. Di-n-octylphthalate	117-84-0	1.4	46
59. Benzo(b)fluoroanthene**	205-99-2	0.18	58
60. Benzo(k)fluoroanthene**	207-06-9	0.17	58
61. Benzo(a)pyrene**	50-32-8	0.20	40
62. Indeno(1,2,3-cd)pyrene**	193-39-5	0.43	97
63. Dibenz(a,h)anthracene**	53-70-3	0.30	89
64. Benzo(g,h,i)perylene**	191-24-2	2.7	91

*The current MDL, which is higher than the MDL originally submitted, will be used as the reporting limit.

**PAH parameters will be analyzed by HPLC.

- Reporting limit for hexachlorobenzene and pentachlorophenol exceed the Class I Groundwater Standard

% - Reporting limit exceeds the Class I Standard - Migration to Groundwater, but meets the ADL in the TACO.

Analytical Method Number: 8270B except the presence of these analytes will be determined by HPLC SW-846 Method 8310.

Method Reference: USEPA SW 846 revision 3, with updates II and II B, July 1992

Maxim Technologies has established annual Method Detection Limits (MDLs) for 1996 in accordance with 40 CFR Part 136 and Maxim Technologies' Quality Assurance Plan. These MDLs are statistically determined limits established using blank reagent water and sodium sulfate and may not reflect what is achievable in site-specific investigative sample matrices. All data will be reported to the MDL and corrected for dilution and percent moisture where appropriate.

Prepared by: Buffalo District COE, Jan 1996

TABLE 4-5
ESTIMATED PROJECT QUANTIFICATION LIMITS (PQL)
FOR FUDS SI'S IN ILLINOIS
INORGANIC TARGET ANALYTE LIST (TAL)

Analyte	Limits *	
	(ug/l)	(mg/kg)
Aluminum	41	3.9
Antimony	6.0	2
Arsenic	5.0	0.5
Barium	7.8	0.8
Beryllium	1.0	0.1
Cadmium	1.4	0.23
Calcium	230	23
Chromium	11	1.1
Cobalt	4.1	0.4
Copper	10	1.0
Iron	58	5.8
Lead	2.0	0.31
Magnesium	230	23
Manganese	4.4	0.5
Mercury	0.2	0.01
Nickel	4.4	0.4
Potassium	230	23
Selenium	4.1	0.4
Silver	5.0	0.5
Sodium	650	65
Thallium	2.0	0.39
Vanadium	4.1	0.4
Zinc	13	1.3
Cyanide	10	10

*Limits will be corrected for dilution and/or percent moisture.

Analytical Method Numbers : As, Pb, Se, TL, Hg, 7000 Series

Other Metals: 6010

Cyanide: 9012/9013

Method Reference: US EPA SW 846 revision 3, with updates II and II B, July 1992

Maxim Technologies has established annual Method Detection Limits (MDLs) for 1996 in accordance with 40 CFR Part 136 and Maxim Technologies' Quality Assurance Plan. These MDLs are statistically determined limits established using blank reagent water and sodium sulfate and may not reflect what is achievable in site-specific investigative sample matrices. All data will be reported to the MDL and corrected for dilution and percent moisture where appropriate.

Prepared by: Buffalo District COE, Jan 1996

TABLE 4-6

SUMMARY OF WATER COLLECTION, PRESERVATION
AND STORAGE REQUIREMENTS FOR EACH SAMPLE

Parameter	Preservative	Holding Time	Containers	Container Preparation
Volatile TCL Organics	4°C No headspace, HCl, pH <2 (and Na ₂ S ₂ O ₃ , if chlorinated)	14 days	Two 40 ml glass vials, with Teflon-lined septum and screw caps	Purchase new, precleaned bottles from supplier
Semi-Volatile TCL Organics	4°C	7 days until extraction 40 days after extraction	Two 1-liter amber with Teflon-lined lids	Purchased new, precleaned bottles from supplier
Total TAL Metals	HNO ₃ , pH <2	6 months, except Hg 28 days	Two 1 liter (64 oz) high density polyethylene bottles with Teflon-lined lid	Purchased new, precleaned bottles from supplier
Dissolved TAL Metals	Field filtered prior to addition of HNO ₃ , pH <2, 4°C	6 months, except Hg 28 days	Two 1 liter (64 oz) high density polyethylene bottles with Teflon-lined lid	Purchased new, precleaned bottles from supplier
BTEX	4°C No headspace, HCl, pH <2 (and Na ₂ S ₂ O ₃ , if chlorinated)	14 days	Two 40 ml glass vials, with Teflon-lined septum and screw caps	Purchase new, precleaned bottles from supplier

*Purchased new, equivalent to pre-certified I-Chem 300 Series containers.

TABLE 4-7

**SUMMARY OF SOIL COLLECTION, PRESERVATION
AND STORAGE REQUIREMENTS FOR EACH SAMPLE PARAMETER**

Parameter	Preservative	Holding Time	Containers	Container Preparation
Total TAL Metals	4°C	6 months, except Hg 28 days	8 oz glass with Teflon-lined lid (metals sample container)	New; rinse with dilute HNO ₃ and then with DI water
BTEX	4°C, No head space	14 days	Two 4 oz wide-mouth glass with Teflon-lined septum and screw caps	Vial and septum washed with soap and water; rinsed with deionized distilled water; dried in muffle furnace at 105°C for one hour. Purchased new (precleaned by Pierce Chemical)
Metals/XRF, Soil	Air dry at ambient temperature	6 months, except Hg 28 days	8 oz glass with Teflon-lined lid (metals sample container)	New; rinse with dilute HNO ₃ and then with DI water

*Purchased new, equivalent to pre-certified I-Chem 300 Series containers.

TABLE 6-1

**SUMMARY OF SOIL CLEANUP OBJECTIVES
VOLATILE ORGANIC COMPOUNDS (ug/Kg)
FORMER NIKE MISSILE BATTERY C-70
NAPERVILLE, ILLINOIS**

Compound	Tier 1 Soil Cleanup Objectives(1)(2)
Chloromethane	2000 (PRG)
Bromomethane	100
Vinyl chloride	2 (INH)
Chloroethane	1,100,000 (PRG)
Methylene Chloride	10
Acetone	8000
Carbon Disulfide	11000 (INH)
1,1-Dichloroethene	30
1,1-Dichloroethane	11000
1,2-Dichloroethene (total)	500
Chloroform	200 (INH)
1,2-Dichloroethane	10
2-Butanone	8,700,000 (PRG)
1,1,1-Trichloroethane	900
Carbon Tetrachloride	30
Vinyl Acetate	84000
Bromochloromethane	300
1,2-Dichloropropane	20
cis-1,3-Dichloropropene	1
Trichloroethene	20
Dibromochloromethane	200
1,1,2-Trichloroethane	10
Benzene	20
trans-1,3-Dichloropropene	1
Bromoform	500
4-Methyl-2-pentanone	-
2-Hexanone	-
Tetrachloroethene	40
1,1,2,2-Tetrachloroethane	900 (PRG)
Toluene	5000
Chlorobenzene	600
Ethylbenzene	5000
Styrene	2000
Xylene (total)	74000

(1) Unless otherwise indicated, the source of the cleanup objectives (CUOs) presented in the table is the draft version of the "Tiered Approach to Cleanup Objectives (Proposed Part 742 Regulations [4/8/96])" published by the Illinois Environmental Protection Agency.

(2) The Cleanup Objective (CUO) reported is the most conservative presented for the residential property scenario. In most cases the CUO reported is related to the migration to Class I Groundwater Route. In cases where the lowest CUO is related to an injection route, the reported CUO will be followed by (ING). In cases where the most conservative CUO is related to the inhalation route the reported CUO is followed by (INH).

PRG - Region IX Preliminary Remediation Goals for Residential Soil (9/95)

- indicates that no CUO was identified for a specific compound

TABLE 6-2	
SUMMARY OF SOIL CLEANUP OBJECTIVES SEMI-VOLATILE ORGANIC COMPOUNDS (ug/Kg) FORMER NIKE MISSILE BATTERY C-70 NAPERVILLE, ILLINOIS	
Compound	Tier 1 Soil Cleanup Objectives (1) (2)
Phenol	49000
bis(2-Chloroethyl)Ether	0.3
2-Chlorophenol	2000
1,3-Dichlorobenzene	2,800,000 (PRG)
1,4-Dichlorobenzene	1000
1,2-Dichlorobenzene	6000
2-Methylphenol	6000
bis(2-Chloroisopropyl)ether	3900 (PRG)
4-Methylphenol	330,000 (PRG)
N-Nitroso-d-n-propylamine	0.02
Hexachloroethane	300
Nitrobenzene	80
Isophorone	4000
2-Nitrophenol	-
2,4-Dimethylphenol	3000
bis(2-Chloroethoxy)methane	-
2,4-Dichlorophenol	500
1,2,4-Trichlorobenzene	2000
Naphthalene	30000
4-Chloroaniline	300
Hexachlorobutadiene	5700 (PRG)
4-Chloro-3-methylphenol	-
2-Methylnaphthalene	-
Hexachlorocyclopentadiene	2000 (INH)
2,4,6-Trichlorophenol	80
2,4,5-Trichlorophenol	120000
2-Chloronaphthalene	5,200,000 (PRG)
2-Nitroaniline	3900 (PRG)
Dimethylphthalate	1200000
Acenaphthylene	15000
2,6-Dinitrotoluene	100
3-Nitroaniline	-
Acenaphthene	200000
2,4-Dinitrophenol	100
4-Nitrophenol	-
Dibenzofuran	260,000 (PRG)
2,4-Dinitrotoluene	200
Diethylphthalate	110000
4-Chlorophenyl-phenyl ether	-
Fluorene	160000
4-Nitroaniline	-
4,6-Dinitro-2-methylphenol	-
N-Nitrosodiphenylamine	200
4-Bromophenyl-phenylether	-
Hexachlorobenzene	400 (ING)
Pentachlorophenol	10
Phenanthrene	140,000
Anthracene	4300000
Di-n-butylphthalate	100,000
Fluoranthene	980000
Pyrene	1400000
Butylbenzylphthalate	68000
3,3'-Dichlorobenzidine	10
Benzo(a)anthracene	700
Chrysene	1000
bis(2-Ethylhexyl)phthalate	11000
Di-n-octylphthalate	1800000 (ING)
Benzo(b)fluoranthene	900 (ING)
Benzo(k)fluoranthene	4000
Benzo(a)pyrene	90 (ING)
Indeno(1,2,3-cd)pyrene	900 (ING)
Dibenzo(a,h)anthracene	90 (ING)
Benzo(g,h,i)perylene	2,300,000 (ING)

(1) Unless otherwise indicated, the source of the cleanup objectives (CUOs) presented in the table is the draft version of the "Tiered Approach to Cleanup Objectives (Proposed Part 742 Regulations [4/8/96])" published by the Illinois Environmental Protection Agency.

(2) The Cleanup Objective (CUO) reported is the most conservative presented for the residential property scenario. In most cases the CUO reported is related to the migration to Class I Groundwater Route. If cases where the lowest CUO is related to an injection route, the reported CUO will be followed by (ING). In cases where the most conservative CUO is related to the inhalation route, the reported CUO is followed by (INH).

PRG - Region IX Preliminary Remediation Goals for Residential Soil (8/95)
 INH - Inhalation exposure pathway
 ING - Ingestion exposure pathway
 - Indicates that no Cleanup Objective (CUO) was identified for a specific compound

TABLE 6-3

SUMMARY OF SOIL CLEANUP OBJECTIVES
METALS (mg/Kg); pH (S.U.)
FORMER NIKE MISSILE BATTERY C-70
NAPERVILLE, ILLINOIS

Element	Cleanup Objectives		Background Level in Illinois Soils Metro Area (4)
	Lowest TACO CUO (2)(3)	pH-Specific Soil Cleanup Objectives pH 7.75 - 8.0(1)	
Arsenic	0.4 (ING)	16	7.2
Chromium	2	-	16.2
Lead	0.15	-	36

(1) These Cleanup Objectives (CUOs) applicable to samples with pH values near 8.0 units; the pH-specific cleanup objectives obtained from "Tiered Approach to Cleanup Objectives [4/8/96] draft"

(2) Unless otherwise indicated, TACO document CUOs are estimated migration to groundwater route values. The TACO document actually reports the CUO in TCLP units (mg/L); TCT used this concentration to back-calculate contaminant concentration in soil required to generate maximum TCLP concentration. The concentration used assumes that the entire mass of contaminants is extracted out of the soil sample and is transferred to the TCLP extractions.

(3) The Cleanup Objective (CUO) reported is the most conservative presented for the residential property scenario. In most cases the CUO reported is related to the migration to Class I Groundwater Route. If cases where the lowest CUO is related to an ingestion route, the reported CUO will be followed by (ING). In cases where the most conservative CUO is related to the inhalation route, the reported CUO is followed by (INH).

(4) Data obtained from IEPA TACO (2/97) Appendix A, Table G.

PRG - Region IX Preliminary Remediation Goals for Residential Soil (9/95).

- Indicated that no CUO was identified for a specific compound.

Shading indicates potential contaminant of concern

ING - Ingestion pathway

INH - Inhalation pathway

TABLE 6-4

**SUMMARY OF GROUNDWATER CLEANUP OBJECTIVES
VOLATILE ORGANIC COMPOUNDS (ug/L)
FORMER NIKE MISSILE BATTERY C-70
NAPERVILLE, ILLINOIS**

CAS No.	Compound	Tier 1 Groundwater Cleanup Objectives(1) (Class I Baseline)
74-87-3	Chloromethane	-
74-83-9	Bromomethane	9.8
75-01-4	Vinyl chloride	2
75-00-3	Chloroethane	710 (PRG)
75-09-2	Methylene Chloride	5
67-64-1	Acetone	700
75-15-0	Carbon Disulfide	700
75-35-4	1,1-Dichloroethene	7
75-34-3	1,1-Dichloroethane	700
540-59-0	1,2-Dichloroethene (total)	170 (2)
67-66-3	Chloroform	0.02
107-06-2	1,2-Dichloroethane	5
78-93-3	2-Butanone	1900 (PRG)
71-55-6	1,1,1-Trichloroethane	200
56-23-5	Carbon Tetrachloride	5
75-27-4	Bromodichloromethane	0.02
78-87-5	1,2-Dichloropropane	5
10061-01-5	cis-1,3-Dichloropropene	0.081 (PRG)(3)
79-01-6	Trichloroethene	5
124-48-1	Dibromochloromethane	140
79-00-5	1,1,1,2-Trichloroethane	5
71-43-2	Benzene	5
10061-02-6	trans-1,3-Dichloropropene	0.081 (PRG)(2)(3)
75-25-2	Bromoform	2
103-10-1	4-Methyl-2-pentanone	2900 (PRG)
591-78-6	2-Hexanone	-
127-18-4	Tetrachloroethene	5
79-34-5	1,1,1,2,2-Tetrachloroethane	5
108-88-3	Toluene	1000
108-90-7	Chlorobenzene	100
100-41-4	Ethylbenzene	700
100-42-5	Styrene	100
1330-20-7	Xylene (total)	10000

PRG = Region IX Preliminary Remediation Goals (9/95)

- = Indicates that no cleanup objective (CUO) was identified for a specific compound

(1) Unless otherwise indicated, the source of the cleanup objectives (CUOs) presented in the table is the draft version of the "Tiered Approach to Cleanup Objectives (Proposed Part 742 Regulations [4/8/96])" published by the Illinois Environmental Protection Agency

(2) Total of cis-DCE and trans-DCE cannot exceed 170 ug/L

(3) Total 1,2-Dichloropropene cannot exceed 0.081 ug/L

TABLE 6-5 SUMMARY OF GROUNDWATER CLEANUP OBJECTIVES SEMI-VOLATILE ORGANIC COMPOUNDS (ug/L) FORMER NIKE MISSILE BATTERY C-70 NAPERVILLE, ILLINOIS		
CAS No.	Compound	Tier 1 Groundwater Cleanup Objectives(1) (Class I Baseline)
103-95-2	Phenol	100
111-44-4	bis(2-Chloroethyl)Ether	10
95-57-8	2-Chlorophenol	35
541-73-1	1,3-Dichlorobenzene	-
106-46-7	1,4-Dichlorobenzene	75
95-50-1	1,2-Dichlorobenzene	600
95-48-7	2-Methylphenol	350
108-60-1	bis(2-Chloroisopropyl)ether	0.27 (PRG)
106-44-5	4-Methylphenol	180 (PRG)
621-64-7	N-Nitroso-di-n-propylamine	10
67-72-1	Hexachloroethane	7
98-95-3	Nitrobenzene	3.5
78-59-1	Isophorone	1400
86-75-5	2-Nitrophenol	-
105-67-9	2,4-Dimethylphenol	140
111-91-1	bis(2-Chloroethoxy)methane	-
120-83-2	2,4-Dichlorophenol	21
120-82-1	1,2,4-Trichlorobenzene	70
91-20-3	Naphthalene	25
106-47-8	4-Chloroaniline	28
87-68-3	Hexachlorobutadiene	0.86 (PRG)
59-50-7	4-Chloro-3-methylphenol	-
91-57-6	2-Methylnaphthalene	-
77-47-4	Hexachlorocyclopentadiene	50
88-06-2	2,4,6-Trichlorophenol	6.4
95-95-4	2,4,5-Trichlorophenol	700
91-58-7	2-Chloronaphthalene	2900 (PRG)
88-74-4	2-Nitroaniline	2.2 (PRG)
131-11-3	Dimethylphthalate	7000
208-96-8	Acenaphthylene	-
606-20-2	2,6-Dinitrotoluene	7
99-09-2	3-Nitroaniline	-
83-32-9	Acenaphthene	420
51-28-5	2,4-Dinitrophenol	14
100-02-7	4-Nitrophenol	-
132-64-9	Dibenzofuran	150 (PRG)
121-14-2	2,4-Dinitrotoluene	14
84-66-2	Diethylphthalate	5600
7005-72-3	4-Chlorophenyl-phenyl ether	-
36-73-7	Fluorene	280
100-01-6	4-Nitroaniline	-
534-52-1	4,6-Dinitro-2-methylphenol	73 (PRG)
86-30-6	N-Nitrosodiphenylamine	10
101-55-3	4-Bromophenyl-phenylether	-
118-74-1	Hexachlorobenzene	0.06
87-86-5	Pentachlorophenol	1
85-01-8	Phenanthrene	-
120-12-7	Anthracene	2100
86-74-8	Carbazole	3.4 (PRG)
84-74-2	Di-n-butylphthalate	700
206-44-0	Fluoranthene	280
129-00-0	Pyrene	210
85-68-7	Butylbenzylphthalate	1400
91-94-1	3,3'-Dichlorobenzidine	20
56-55-3	Benzo(a)anthracene	0.13
218-01-9	Chrysene	1.5
117-81-7	bis(2-Ethylhexyl)phthalate	6
117-84-0	Di-n-octylphthalate	140
205-99-2	Benzo(b)fluoranthene	0.18
207-09-9	Benzo(k)fluoranthene	0.17
50-32-8	Benzo(a)pyrene	0.2
193-39-5	Indeno(1,2,3-cd)pyrene	0.43
53-70-3	Dibenzo(a,h)anthracene	0.3
191-24-2	Benzo(g,h,i)perylene	-

(1) Unless otherwise indicated, the source of the cleanup objectives (CUOs) presented in the table is the draft version of the "Tiered Approach to Cleanup Objectives (Proposed Part 742 Regulations [4/8/96])" published by the Illinois Environmental Protection Agency

PRG = Region IX Preliminary Remediation Goal (9/95)
- = Indicates that no CUO was identified for a specific compound

TABLE 6-6 SUMMARY OF GROUNDWATER CLEANUP OBJECTIVES METALS (ug/L) FORMER NIKE MISSILE BATTERY C-70 NAPERVILLE, ILLINOIS		
CAS No.	Element	Tier 1 Groundwater Cleanup Objectives(1) (Class I Baseline)
7440-38-2	Arsenic	50
7440-47-3	Chromium	100
7439-92-1	Lead	7.5

(1) Unless otherwise indicated, the source of the cleanup objectives (CUOs) presented in the table is the draft version of the "Tiered Approach to Cleanup Objectives (Proposed Part 742 Regulations [4/8/96])" published by the Illinois Environmental Protection Agency

**TABLE 7-1
SUMMARY OF XRF ANALYTICAL RESULTS
SOIL BORING AND HAND AUGER SAMPLES
FORMER NIKE MISSILE BATTERY C-70 SITE
NAPERVILLE, ILLINOIS**

Sample No.:	HA1031	HA1031R	HA1032	HA1033	HA1034	HA1035	HA1036	HA1037	Tier 1 Soil Cleanup Objectives
Site Name:	Eastern Section	Eastern Section	Eastern Section	Southern Berm	Southern Berm	Southern Berm	Southern Berm	Southern Berm	
Sample Origin:	HA1	HA1	HA1	HA2	HA2	HA3	HA3	HA4	
Coordinates N:	9143.2484	9143.2484	9143.2484	8704.2009	8704.2009	8721.5824	8721.5824	8730.8521	
Coordinates E:	1780.637	1780.637	1780.637	1698.5682	1698.5682	1566.7911	1566.7911	1337.7308	
Sampling Depth (ft):	0-2	0-2	2-3	1-2	2-3	0-2	2-3	0-1.5	
Lab No.:	HA-031	HA-031R	HA-032	HA-033	HA-034	HA-035	HA-036	HA-037	
Collection Date:	12/10/96	12/10/96	12/10/96	12/10/96	12/10/96	12/10/96	12/10/96	12/10/96	
Analysis Date:	12/12/96	12/12/96	12/12/96	12/12/96	12/12/96	12/12/96	12/12/96	12/12/96	
CAS No.:	Compound		Results						Tier 1 Soil Cleanup Objectives
7440-38-2	Arsenic	14.0	11.8	9.02	7.97	11.7	5.59M	7.64	
7440-47-3	Chromium	53.5	64.5	52	34.8	48.2	49.9	47.7	
7439-92-1	Lead	18.3	19.0	22.5	22.5	14.9M	22.4	21.5	

Sample No.:	HA1038	HA1039	HA1040	HA1041	HA1042	HA1042D	HA1045	B1001D	Tier 1 Soil Cleanup Objectives
Site Name:	Southern Berm	Southern Berm	Southern Berm	Southern Berm	Southern Berm	Southern Berm	Eastern Section	SE of Earthen Berm	
Sample Origin:	HA4	HA5	HA5	HA6	HA6	HA6D	HA1DUP	TWP-1	
Coordinates N:	8730.8521	8737.5225	8737.5225	8772.4096	8772.4096	8772.4096	9143.2484	8635.7863	
Coordinates E:	1337.7308	1276.1067	1276.1067	1279.1353	1279.1353	1279.1353	1780.637	1816.199	
Sampling Depth (ft):	1.5-3	0-2	2-3	1-2	2-3	2-3	0-2	1-2	
Lab No.:	HA-038	HA-039	HA-040	HA-041	HA-042	HA-042D	HA-045	SB-001D	
Collection Date:	12/10/96	12/10/96	12/10/96	12/10/96	12/10/96	12/10/96	12/10/96	12/14/96	
Analysis Date:	12/12/96	12/12/96	12/12/96	12/12/96	12/12/96	12/12/96	12/12/96	12/17/96	
CAS No.:	Compound		Results						Tier 1 Soil Cleanup Objectives
7440-38-2	Arsenic	9.89	9.37	13	8.53	9.79	11.4	14.2	
7440-47-3	Chromium	55.8	51.9	63	59.2	36.2	59.2	65.2	
7439-92-1	Lead	19.9	28.9	21.2	19.5	16.9	22.7	17.5	

Sample No.:	B1001	B1002	B1003	B1004	B1005	B1006	B1007	B1008	Tier 1 Soil Cleanup Objectives
Site Name:	SE of Earthen Berm	SE of Earthen Berm	SE of Earthen Berm	NE of Pond B	NE of Pond B	NE of Pond B	NE of Bldg. 1717	NE of Bldg. 1717	
Sample Origin:	TWP-1	TWP-1	TWP-1	TWP-2	TWP-2	TWP-2	TWP-3	TWP-3	
Coordinates N:	8635.7863	8635.7863	8635.7863	8958.6262	8958.6262	8958.6262	8958.6262	9154.3576	
Coordinates E:	1816.199	1916.199	1816.199	1533.0591	1533.0591	1533.0591	1533.0591	1445.9267	
Sampling Depth (ft):	1-2	2-3	40-41	14-16	39-40	39-40	2-4	5-7	
Lab No.:	SB-001	SB-002	SB-003	SB-004	SB-005	SB-006	SB-007	SB-008	
Collection Date:	12/14/96	12/14/96	12/14/96	12/09/96	12/09/96	12/10/96	12/15/96	12/15/96	
Analysis Date:	12/17/96	12/17/96	12/17/96	12/12/96	12/12/96	12/12/96	12/17/96	12/17/96	
CAS No.:	Compound		Results						Tier 1 Soil Cleanup Objectives
7440-38-2	Arsenic	11.9	13.5	11.5	19	7.3	8.65	12.9	
7440-47-3	Chromium	43.1	77.4	41.4M	72.9	26.0M	61.2	61.3	
7439-92-1	Lead	12.4	17.3	<MDL	11.0M	ND	<MDL	21.9	

**TABLE 7-1
SUMMARY OF XRF ANALYTICAL RESULTS
SOIL BORING AND HAND AUGER SAMPLES
FORMER NIKE MISSILE BATTERY C-70 SITE
NAPERVILLE, ILLINOIS**

CAS No.:	Sample No.:	B1009	B1010	B1011	B1012	B1013	B1014	B1015	B1027D	Tier 1 SB-013 Cleanup Objectives
	Site Name:	NE of Bldg. 1717		NE of Bldg. 1717		W of Bldg. 1717 Pkg Gr		E of Bldg. 270		
	Sample Origin:	TWP-3		TWP-4		TWP-5		TWP-6		
	Coordinates N:	9154.3578	9090.9983	9090.9983	9090.9983	8763.6929	8763.6929	8763.6929	9916.3423	
	Coordinates E:	1445.9267	1128.127	1128.127	1128.127	1021.5991	1021.5991	1021.5991	757.6361	
	Sampling Depth (ft):	40-42	4.5-5.5	9-12	40-41	3-4	8-9	40-41	50-50.5	
	Lab No.:	SB-009	SB-010	SB-011	SB-012	SB-013	SB-014	SB-015	SB-027D	
	Collection Date:	12/15/96	12/14/96	12/14/96	12/14/96	12/10/96	12/10/96	12/13/96	12/15/96	
Analysis Date:	12/16/96	12/18/96	12/18/96	12/18/96	12/16/96	12/16/96	12/16/96	12/18/96		
Results										
Compound										
7440-38-2	Arsenic	6.95M	15.6	11.7	7.98M	22.6	13.6	9.51	ND	1.0 (ING)
7440-47-3	Chromium	<MDL	67.1	51.5	30.7M	77.2	82.8	45.7	71.3	2
7439-92-1	Lead	13.2M	21.3	13.4M	<MDL	12.4M	19.1	<MDL	11.4M	0.15

Sample No.:	B1016	B1017	B1018	B1019	B1020	B1021	B1022	B1023	Tier 1 Soil Cleanup Objectives	
Site Name:	W of Bldg. 1717	W of Bldg. 1717	W of Bldg. 1717	N of Bldg. 1717	N of Bldg. 1717	N of Bldg. 1717	N of Bldg. 270	N of Bldg. 270		
Sample Origin:	TWP-6	TWP-6	TWP-6	TWP-7	TWP-7	TWP-7	TWP-8	TWP-8		
Coordinates N:	9017.1328	9017.1328	9017.1328	9200.6181	9200.6181	9200.6181	9944.0951	9944.0951		
Coordinates E:	1050.5759	1050.5759	1050.5759	1246.419	1246.419	1246.419	711.2203	711.2203		
Sampling Depth (ft):	4-5	5.6-6.5	45-46	3-5	5-7	40-41	1.5-3.5	4-5		
Lab No.:	SB-016	SB-017	SB-018	SB-019	SB-020	SB-021	SB-022	SB-023		
Collection Date:	12/13/96	12/13/96	12/13/96	12/14/96	12/14/96	12/14/96	12/15/96	12/15/96		
Analysis Date:	12/16/96	12/16/96	12/16/96	12/18/96	12/18/96	12/18/96	12/18/96	12/18/96		
CAS No.:	Compound								Results	
7440-38-2	Arsenic	20.3	21.7	<MDL	20.9	10.4	ND	21.9	14	1.0 (ING)
7440-47-3	Chromium	55.2	39.9M	19.4M	60.9	68.6	<MDL	78.7	56	2
7439-92-1	Lead	14.3M	11.5M	<MDL	16.6	17.2	15.2	12.6M	23.8	0.15

CAS No.:	Sample No.:	B1024	B1025	B1026	B1027	B1028	B1029	B1030	B1043FD	Tier 1 Soil Cleanup Objectives
	Site Name:	N of Bldg. 270	E of Bldg. 270	E of Bldg. 270	E of Bldg. 270	E of Bldg. 1717	E of Bldg. 1717	E of Bldg. 1717	NE of Bldg. 1717	
	Sample Origin:	TWP-9	TWP-9	TWP-9	TWP-9	TWP-10	TWP-10	TWP-10	TWP-4	
	Coordinates N:	9944.0951	9916.3423	9916.3423	9916.3423	8835.2898	8835.2898	8835.2898	9090.9983	
	Coordinates E:	711.2203	757.6361	757.6361	757.6361	1237.3666	1237.3666	1237.3666	1128.127	
	Sampling Depth (ft):	50-52	1.5-3.5	3.5-5.5	50-50.5	6-8	14-16	34-35	9-12	
	Lab No.:	SB-024	SB-025	SB-026	SB-027	SB-028	SB-029	SB-030	SB-043FD	
	Collection Date:	12/15/96	12/15/96	12/15/96	12/15/96	12/10/96	12/10/96	12/10/96	12/14/96	
Analysis Date:	12/18/96	12/18/96	12/18/96	12/18/96	12/12/96	12/12/96	12/12/96	12/11/96	12/18/96	
CAS No.:	Compound	Results								
7440-38-2	Arsenic	7.65M	19.4	9.22	41.9M	16	15.3	4.26M	20.9	1.0 (ING)
7440-47-3	Chromium	51.6	79.7	82.6	31.1M	89.3	60.5	41.0M	51.4	2
7439-92-1	Lead	13.6M	16.7	21.5	<MDL	16.1	14.1M	<MDL	12.2M	0.15

TABLE 7-2
SUMMARY OF GROUNDWATER SAMPLING COLLECTION DATA
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY C-70 SITE, NAPERVILLE, ILLINOIS

Well ID LOC.#	Sampling Date	Db (ft)	Dw (ft)	Dt (ft)	Sampling Time	Cumulative Volume Purged (gal)	Temp. (°C)	Physical Appearance	Odor	pH	Conductivity umhos/cm	PID (ppm)	Thickness of Pure Product (ft)	Sample ID
MW-1	12/12/96	38.00	30.75	7.25	10:15	6.6	12.0	Turb./reddish	None	6.8	165	NR	None	GW-055
MW-2	12/11/96	38.75	32.69	6.06	16:50	4.9	11.2	Turbid	None	6.3	1309	NR	None	GW-056
MW-3	12/12/96	43.65	36.48	7.17	11:10	6.0	11.9	Sl. turbid	None	6.8	190	NR	None	GW-057
TWP-1	12/14/96	49.50	39.00	10.50	11:15	N/A	NR	Very Turbid	None	7.1	968	NR	None	GW-045
TWP-2	12/10/96	43.00	30.30	12.70	17:30	N/A	NR	Turbid	None	NR	NR	NR	None	GW-046
TWP-3	12/15/96	40.00	33.00	2.00	10:10	N/A	11.0	Very Turbid	None	6.8	156	NR	None	GW-047
TWP-4	12/14/96	45.00	37.33	7.67	16:15	N/A	12.1	Very Turbid	None	6.8	1480	NR	None	GW-048
TWP-5	12/13/96	45.00	37.50	7.50	15:00	N/A	13.1	Very Turbid	None	7.1	166	NR	None	GW-049
TWP-6	12/14/96	45.00	36.75	8.25	08:45	N/A	12.1	Very Turbid	None	7.0	171	NR	None	GW-050
TWP-7	12/14/96	41.00	34.08	6.92	18:45	N/A	12.7	Turbid/Brown	None	7.0	1228	NR	None	GW-051
TWP-8	12/16/96	55.00	48.67	6.33	07:50	N/A	NR	Very Turbid	None	NR	NR	NR	None	GW-052
TWP-9	12/15/96	55.00	48.33	6.67	16:00	N/A	NR	Very Turbid	None	NR	NR	NR	None	GW-053
TWP-10	12/10/96	49.00	36.17	12.83	18:30	N/A	NR	Very Turbid	None	NR	NR	NR	None	GW-054
Trip Blank	12/14/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	TE-1
Trip Blank	12/15/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	TE-2

NA = Not applicable

NR = Not recorded

Dw = Water level to surface elevation

Db = Depth to the bottom of the well to surface elevation

Dt = Height of the water column in the well (Db - Dw = Dt)

TABLE 7-3
SUMMARY OF EXISTING WELL SAMPLING ACTIVITIES
FORMER NIKE BATTERY C-70
NAPERVILLE, ILLINOIS

		Water Measurements		Water Quality				
Number		Depth to Water (ft)	Elevation of Water	pH	Electrical Conductivity	Physical Appearance	Temp (C°)	Sample Date/Time
MW-1	<u>Initial</u>	30.75	699.86	6.8	169	Sl. turbid	11.4	12/12/96
	<u>Final</u>	30.81	699.80	6.8	165	Very turbid	12.0	10:15
MW-2	<u>Initial</u>	32.69	699.82	6.2	1388	Sl. turbid	10.9	12/11/96
	<u>Final</u>	NR	NR	6.3	1309	Turbid	11.2	16:50
MW-3	<u>Initial</u>	36.65	700.23	6.8	189	Sl. turbid	11.6	12/12/96
	<u>Final</u>	36.65	700.23	6.8	190	Sl. turbid	11.9	11:45
Public Well #10	<u>Initial</u>	NA	NA	6.7	1106	Clear	10.7	12/11/97
	<u>Final</u>	NA	NA	NR	NR	Sl. turbid	NR	10:30

NA = Not Available

NR = Not Recorded

TABLE 8 - 1
SUMMARY OF ANALYTICAL RESULTS FOR METALS (As, Cr, Pb) & pH
BACKGROUND SOIL BORING SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	SB-001	SB-002	SB-003	Tier 1 Soil Cleanup Objectives (1)(2)	Background Level in Illinois Soils Metro Area (3)
	Sample Origin:	TWP-1	TWP-1	TWP-1		
	Coordinates N:	8635.7863	8635.7863	8635.7863		
	Coordinates E:	1816.1990	1816.1990	1816.1990		
	Elevation (MSL):	739.59	739.59	739.59		
	Sampling Depth (ft):	1 - 2	2 - 3	40 - 41		
	Soil Type:	Silty Clay	Silty Clay	Sand/Gravel		
	SDG No.:	SB-001	SB-001	SB-001		
	Lab No.:	9701037-09	9701037-10	9701037-11		
	Collection Date:	12/14/96	12/14/96	12/14/96		
CAS No.	Parameter - Method (units)	Results				
7440-38-2	Arsenic - 3050A/7060A (mg/kg)	11.7 [28]	15.1 [29]	2.9 [31]	1.0	7.2
7440-47-3	Chromium - 3050A/6010A (mg/kg)	22.9 [46]	20.4 [38]	4.6 [28]	2	16.2
7439-92-1	Lead - 3050A/7421 (mg/kg)	20.2	17.9	3.2	0.15	36
	pH - 9045C (pH units)	5.87	6.77	8.5	-	-

(1) Unless otherwise indicated, the source of the cleanup objectives (CUOs) presented in the table is the draft version of the "Tiered Approach to Cleanup Objectives (Proposed Part 742 Regulations [2/97] published by the Illinois Environmental Protection Agency

(2) The CUO reported is the most conservative presented for the residential property scenario. In most cases the CUO reported is related to the migration to Class I Groundwater Route. If cases where the lowest CUO is related to an ingestion route, the reported CUO will be followed by (ING). In cases where the most conservative CUO is related to the inhalation route, the reported CUO is followed by (INH).

(3) Data obtained from IEPA TACO (2/97) Appendix A , Table G.

[] - pH Specific Soil Remediation Objectives for inorganics for the migration to Groundwater portion of the Groundwater Ingestion Route (Class I Groundwater). This is presented in TACO section 742 - Appendix B, Table C.

TABLE 8 - 2
SUMMARY OF ANALYTICAL RESULTS FOR METALS (As, Cr, Pb) & pH
BACKGROUND HAND AUGER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	HA-31	HA-32	HA-45	Tier 1 Soil Cleanup Objectives (1)(2)	Background Level in Illinois Soils Metro Area (3)
	Sample Origin:	HA1	HA1	HA1DUP		
	Coordinates N:	9143.2484	9143.2484	9143.2484		
	Coordinates E:	1780.6370	1780.6370	1780.6370		
	Elevation (MSL):	741.70	741.70	741.70		
	Sampling Depth (ft):	0 - 2	2 - 3	0 - 2		
	Soil Type:	Clayey Silt	Clayey Silt	Clayey Silt		
	SDG No.:	SB-001	SB-001	SB-001		
	Lab No.:	9701037-01	9701037-02	9701037-08		
	Collection Date:	12/13/96	12/10/96	12/13/96		
CAS No.	Parameter - Method (units)	Results				
7440-38-2	Arsenic - 3050A/7060A (mg/kg)	10.8 [31]	12.2 [31]	9.8 [30]	1.0	7.2
7440-47-3	Chromium - 3050A/6010A (mg/kg)	8.8 [28]	19.7 [28]	10.3 [32]	2	16.2
7439-92-1	Lead - 3050A/7421 (mg/kg)	15.7	21.8	14.4	0.15	36
	pH - 9045C (pH units)	7.85	7.63	7.55	-	-

(1) Unless otherwise indicated, the source of the cleanup objectives (CUOs) presented in the table is the draft version of the "Tiered Approach to Cleanup Objectives (Proposed Part 742 Regulations [2/97] published by the Illinois Environmental Protection Agency

(2) The CUO reported is the most conservative presented for the residential property scenario. In most cases the CUO reported is related to the migration to Class I Groundwater Route. If cases where the lowest CUO is related to an ingestion route, the reported CUO will be followed by (ING). In cases where the most conservative CUO is related to the inhalation route, the reported CUO is followed by (INH).

(3) Data obtained from IEPA TACO (2/97) Appendix A , Table G.

[] - pH Specific Soil Remediation Objectives for inorganics for the migration to Groundwater portion of the Groundwater Ingestion Route (Class I Groundwater). This is presented in TACO section 742 - Appendix B, Table C.

TABLE 8-3
SUMMARY OF ANALYTICAL RESULTS FOR METALS (As, Cr, Pb) & pH
SOIL BORING AND HAND AUGER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	HA-31	HA-32	HA-45	HA-34	Tier 1 Soil Cleanup Objectives (1)(2)	Background Level in Illinois Soils Metro Area (3)
	Sample Origin:	HA1	HA1	HA1DUP	HA2		
	Coordinates N:	9143.2484	9143.2484	9143.2484	8704.2009		
	Coordinates E:	1780.6370	1780.6370	1780.6370	1698.5682		
	Elevation (MSL):	741.70	741.70	741.70	754.69		
	Sampling Depth (ft):	0 - 2	2 - 3	0 - 2	2 - 3		
	Soil Type:	Clayey Silt	Clayey Silt	Clayey Silt	Clayey Silt		
	SDG No.:	SB-001	SB-001	SB-001	SB-001		
	Lab No.:	9701037-01	9701037-02	9701037-08	9701037-03		
	Collection Date:	12/13/96	12/10/96	12/13/96	12/10/96		
CAS No.	Parameter - Method (units)	Results					
7440-38-2	Arsenic - 3050A/7060A (mg/kg)	10.8 [31]	12.2 [31]	9.8 [30]	9 [30]	1.0	7.2
7440-47-3	Chromium - 3050A/6010A (mg/kg)	8.8 [28]	19.7 [28]	10.3 [32]	15.1 [32]	2	16.2
7439-92-1	Lead - 3050A/7421 (mg/kg)	15.7	21.8	14.4	23.8	0.15	36
	pH - 9045C (pH units)	7.85	7.63	7.55	7.36	-	-

TABLE 8-3
SUMMARY OF ANALYTICAL RESULTS FOR METALS (As, Cr, Pb) & pH
SOIL BORING AND HAND AUGER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	HA-36	HA-38	HA-40	HA-42	Tier 1 Soil Cleanup Objectives (1)(2)	Background Level in Illinois Soils Metro Area (3)
	Sample Origin:	HA3	HA4	HA5	HA6		
	Coordinates N:	8721.5824	8730.8521	8737.5225	8772.4096		
	Coordinates E:	1566.7911	1337.7308	1276.1067	1279.1353		
	Elevation (MSL):	751.13	744.54	746.38	739.33		
	Sampling Depth (ft):	2 - 3	1.5 - 3	2 - 3	2 - 3		
	Soil Type:	Clayey Silt	Clayey Silt	Clayey Silt	Clayey Silt		
	SDIG No.:	SB-001	SB-001	SB-001	SB-001		
	Lab No.:	9701037-04	9701037-05	9701037-06	9701037-07		
	Collection Date:	12/10/96	12/10/96	12/10/96	12/10/96		
CAS No.	Parameter - Method (units)	Results					
7440-38-2	Arsenic - 3050A/7060A (mg/kg)	8 [30]	10.2 [31]	12.7 [30]	10.6 [30]	1.0	7.2
7440-47-3	Chrom um - 3050A/6010A (mg/kg)	13.3 [32]	13.8 [28]	19.7 [32]	20.3 [32]	2	16.2
7439-92-1	Lead - 3050A/7421 (mg/kg)	19.9	19	17.9	25.9	0.15	36
	pH - 9045C (pH units)	7.48	7.86	7.34	7.25	-	-

TABLE 8-3
SUMMARY OF ANALYTICAL RESULTS FOR METALS (As, Cr, Pb) & pH
SOIL BORING AND HAND AUGER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	SB-001	SB-002	SB-003	SB-004	Tier 1 Soil Cleanup Objectives (1)(2)	Background Level in Illinois Soils Metro Area (3)
	Sample Origin:	TWP-1	TWP-1	TWP-1	TWP-2		
	Coordinates N:	8635.7863	8635.7863	8635.7863	8958.6262		
	Coordinates E:	1816.1990	1816.1990	1816.1990	1533.0591		
	Elevation (MSL):	739.59	739.59	739.59	736.76		
	Sampling Depth (ft):	1 - 2	2 - 3	40 - 41	14 - 16		
	Soil Type:	Silty Clay	Silty Clay	Sand/Gravel	Silty Clay		
	SCG No.:	SB-001	SB-001	SB-001	SB-001		
	Lab No.:	9701037-09	9701037-10	9701037-11	9701037-12		
	Collection Date:	12/14/96	12/14/96	12/14/96	12/09/96		
CAS No.	Parameter - Method (units)	Results					
7440-38-2	Arsenic - 3050A/7060A (mg/kg)	11.7 [28]	15.1 [29]	2.9 [31]	11.1 [31]	1.0	7.2
7440-47-3	Chromium - 3050A/6010A (mg/kg)	22.9 [46]	20.4 [38]	4.6 [28]	14.6 [28]	2	16.2
7439-92-1	Lead - 3050A/7421 (mg/kg)	20.2	17.9	3.2	15.2	0.15	36
	pH - 9045C (pH units)	5.87	6.77	8.5	8.32	-	-

TABLE 8-3
SUMMARY OF ANALYTICAL RESULTS FOR METALS (As, Cr, Pb) & pH
SOIL BORING AND HAND AUGER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	SB-007	SB-011	SB-043	SB-015	Tier 1 Soil Cleanup Objectives (1)(2)	Background Level in Illinois Soils Metro Area (3)
	Sample Origin:	TWP-3	TWP-4	TWP-4Dup	TWP-5		
	Coordinates N:	9154.3576	9090.9983	9090.9983	8763.6929		
	Coordinates E:	1445.9267	1128.1270	1128.1270	1021.5991		
	Elevation (MSL):	738.91	739.06	739.06	737.10		
	Sampling Depth (ft):	1 - 4	9 - 12	9 - 12	40 - 41		
	Soil Type:	Silty Clay	Silty Clay	Silty Clay	Sand/Gravel		
	SDG No.:	SB-001	SB-001	SB043	SB-001		
	Lab No.:	9701037-13	9701037-14	9701037-21	9701037-15		
	Collection Date:	12/15/96	12/14/96	12/14/96	12/13/96		
CAS No.	Parameter - Method (units)	Results					
7440-38-2	Arsenic - 3050A/7060A (mg/kg)	9 [31]	14.7 [31]	14 [31]	3.9 [29]	1.0	7.2
7440-47-3	Chromium - 3050A/6010A (mg/kg)	13.2 [28]	11.7 [28]	10.1 [28]	5.1 [36]	2	16.2
7439-92-1	Lead - 3050A/7421 (mg/kg)	16.6	18.1	17.9	4.1	0.15	36
	pH - 9045C (pH units)	8.4	8.21	8.15	7.11	-	-

TABLE 8-3
SUMMARY OF ANALYTICAL RESULTS FOR METALS (As, Cr, Pb) & pH
SOIL BORING AND HAND AUGER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	SB-016	SB-019	SB-022	SB-026	SB-028	Tier 1 Soil Cleanup Objectives (1)(2)	Background Level in Illinois Soils Metro Area (3)
	Sample Origin:	TWP-6	TWP-7	TWP-8	TWP-9	TWP-10		
	Coordinates N:	9017.1328	9200.6181	9944.0951	9916.3423	8835.2898		
	Coordinates E:	1050.5759	1246.4190	711.2203	757.6361	1237.3666		
	Elevation (MSL):	737.13	739.04	742.89	742.02	738.80		
	Sampling Depth (ft):	4 - 5	3 - 5	1.5 - 3.5	3.5 - 5.5	6 - 8		
	Soil Type:	Silty Clay	Silty Clay	Silty Clay	Silty Clay	Silty Clay		
	SDG No.:	SB-001	SB-001	SB-001	SB-001	SB-001		
	Lab No.:	9701037-16	9701037-17	9701037-18	9701037-19	9701037-20		
	Collection Date:	12/13/96	12/14/96	12/15/96	12/15/96	12/10/96		
CAS No.	Parameter - Method (units)	Results						
7440-38-2	Arsenic - 3050A/7060A (mg/kg)	10.6 [30]	11.7 [31]	12.4 [31]	8.8 [31]	13.6 [30]	1.0	7.2
7440-47-3	Chromium - 3050A/6010A (mg/kg)	15.7 [32]	12.3 [28]	19 [28]	16 [28]	18.7 [32]	2	16.2
7439-92-1	Lead - 3050A/7421 (mg/kg)	14.6	15.8	18.1	14.3	17	0.15	36
	pH - 9045C (pH units)	7.5	8.08	8.5	8.29	7.27	-	-

(1) Unless otherwise indicated, the source of the cleanup objectives (CUOs) presented in the table is the draft version of the "Tiered Approach to Cleanup Objectives (Proposed Part 742 Regulations [2/97] published by the Illinois Environmental Protection Agency

(2) The CUO reported is the most conservative presented for the residential property scenario. In most cases the CUO reported is related to the migration to Class I Groundwater Route. In cases where the lowest CUO is related to an ingestion route, the reported CUO will be followed by (ING). In cases where the most conservative CUO is related to the inhalation route; the reported CUO is followed by (INH).

(3) Data obtained from IEPA TACO (2/97) Appendix A , Table G.

[] - pH Specific Soil Remediation Objectives for inorganics for the migration to Groundwater portion of the Groundwater Ingestion Route (Class I Groundwater). Remediation objectives for the pH range 4.5 - 8.0 are listed in TACO section 742 - Appendix B, Table C. At the direction of the IEPA, remediation objectives listed in the pH range 7.75 - 8.0 may also be used for the pH range 8.0 - 9.0.

TABLE 8-4
SUMMARY OF ANALYTICAL RESULTS FOR BTEX COMPOUNDS
SOIL BORING AND HAND AUGER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	HA-031	HA-045	HA-033	HA-036	Tier 1 Soil Cleanup Objectives (Class I) (1) (2)
	Sample Origin:	HA1	HA1DUP	HA2	HA3	
	Coordinates N:	9143.2484	9143.2484	8704.2009	8721.5824	
	Coordinates E:	1780.6370	1780.6370	1698.5682	1566.7911	
	Elevation (MSL):	741.70	741.70	754.69	751.13	
	Sampling Depth (ft):	0 - 2	0 - 2	2 - 3	2 - 3	
	Soil Type:	Clayey Silt	Clayey Silt	Clayey Silt	Clayey Silt	
	SDG No.:	HA033	HA033	HA033	HA033	
	Lab No.:	9612052-02	9612052-03	9612031-05	9612031-09	
	Collection Date:	12/13/96	12/13/96	12/10/96	12/10/96	
	Analysis Date:	12/17/96	12/17/96	12/16/96	12/16/96	
CAS No.	Parameter - Method (units)	Results				
	BTEX - 8020A (ug/kg)					
71-43-2	-Benzene	1.1U	1.1U	1.3U	1.3U	30
108-88-3	-Toluene	1.1U	1.1U	1.3U	1.3U	12,000
108-90-7	-Chlorobenzene	1.1U	1.1U	1.3U	1.3U	1,000
95-50-1	-1,2-Dichlorobenzene	1.1U	1.1U	1.3U	1.3U	17,000
541-73-1	-1,3-Dichlorobenzene	1.1U	1.1U	1.3U	1.3U	-
106-46-7	-1,4-Dichlorobenzene	1.1U	1.1U	1.3U	1.3U	2,000
100-41-4	-Ethyl Benzene	1.1U	1.1U	1.3U	1.3U	13,000
1330-20-7	-Xylenes	3.4U	3.4U	3.8U	3.9U	150,000

TABLE 8-4
SUMMARY OF ANALYTICAL RESULTS FOR BTEX COMPOUNDS
SOIL BORING AND HAND AUGER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	HA-037	HA-039	HA-041	SB-001	Tier 1 Soil Cleanup Objectives (Class I) (1) (2)
	Sample Origin:	HA4	HA5	HA6	TWP-1	
	Coordinates N:	8730.8521	8737.5225	8772.4096	8635.7863	
	Coordinates E:	1337.7308	1276.1067	1279.1353	1816.1990	
	Elevation (MSL):	744.54	746.38	739.33	739.59	
	Sampling Depth (ft):	1.5 - 3.5	2 - 3	2 - 3	1 - 2	
	Soil Type:	Clayey Silt	Clayey Silt	Clayey Silt	Silty Clay	
	SDG No.:	HA033	HA033	HA033	HA033	
	Lab No.:	9612031-06	9612031-10	9612031-04	9612056-01	
	Collection Date:	12/10/96	12/10/96	12/10/96	12/14/96	
	Analysis Date:	12/16/96	12/16/96	12/16/96	12/18/96	
CAS No.	Parameter - Method (units)	Results				
	BTEX - 8020A (ug/kg)					
71-43-2	-Benzene	1.2U	1.2U	1.2U	1.3U	30
108-88-3	-Toluene	1.2U	1.2U	1.2U	1.3U	12,000
108-90-7	-Chlorobenzene	1.2U	1.2U	1.2U	1.3U	1,000
95-50-1	-1,2-Dichlorobenzene	1.2U	1.2U	1.2U	1.3U	17,000
541-73-1	-1,3-Dichlorobenzene	1.2U	1.2U	1.2U	1.3U	-
106-46-7	-1,4-Dichlorobenzene	1.2U	1.2U	1.2U	1.3U	2,000
100-41-4	-Ethyl Benzene	1.2U	1.2U	1.2U	1.3U	13,000
1330-20-7	-Xylenes	3.5U	3.6U	3.8U	3.9U	150,000

TABLE 8-4
SUMMARY OF ANALYTICAL RESULTS FOR BTEX COMPOUNDS
SOIL BORING AND HAND AUGER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	SB-002	SB-003	SB-004	SB-008	Tier 1 Soil Cleanup Objectives (Class I) (1) (2)
	Sample Origin:	TWP-1	TWP-1	TWP-2	TWP-3	
	Coordinates N:	8635.7863	8635.7863	8958.6262	9154.3576	
	Coordinates E:	1816.1990	1816.1990	1533.0591	1445.9267	
	Elevation (MSL):	739.59	739.59	736.76	738.91	
	Sampling Depth (ft):	2 - 3	40 - 41	14 - 16	1 - 4	
	Soil Type:	Silty Clay	Sand/Gravel	Silty Clay	Silty Clay	
	SDG No.:	HA033	HA033	HA033	HA033	
	Lab No.:	9612056-02	9612056-03	9612031-07	9612056-04	
	Collection Date:	12/14/96	12/14/96	12/09/96	12/15/96	
	Analysis Date:	12/18/96	12/18/96	12/16/96	12/18/96	
CAS No.	Parameter - Method (units)	Results				
	BTEX - 8020A (ug/kg)					
71-43-2	-Benzene	1.3U	1.1	1.6	1.2U	30
108-88-3	-Toluene	1.3U	1.0U	1.2U	1.2U	12,000
108-90-7	-Chlorobenzene	1.3U	1.0U	1.2U	1.2U	1,000
95-50-1	-1,2-Dichlorobenzene	1.3U	1.0U	1.2U	1.2U	17,000
541-73-1	-1,3-Dichlorobenzene	1.3U	1.0U	1.2U	1.2U	-
106-46-7	-1,4-Dichlorobenzene	1.3U	1.0U	1.2U	1.2U	2,000
100-41-4	-Ethyl Benzene	1.3U	1.0U	1.2U	1.2U	13,000
1330-20-7	-Xylenes	4.0U	3.1U	3.5U	3.6U	150,000

TABLE 8-4
SUMMARY OF ANALYTICAL RESULTS FOR BTEX COMPOUNDS
SOIL BORING AND HAND AUGER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	SB-011	SB-043	SB-013	SB-016	Tier 1 Soil Cleanup Objectives (Class I) (1) (2)
	Sample Origin:	TWP-4	TWP-4	TWP-5	TWP-6	
	Coordinates N:	9090.9983	9090.9983	8763.6929	9017.1328	
	Coordinates E:	1128.1270	1128.1270	1021.5991	1050.5759	
	Elevation (MSL):	739.06	739.06	737.10	737.13	
	Sampling Depth (ft):	9 - 12	9 - 12	40 - 41	4 - 5	
	Soil Type:	Silty Clay	Silty Clay	Sand/Gravel	Silty Clay	
	SDG No.:	HA033	HA033	HA033	HA033	
	Lab No.:	9612056-05	9612056-09	9612052-04	9612052-05	
	Collection Date:	12/14/96	12/14/96	12/13/96	12/13/96	
	Analysis Date:	12/18/96	12/18/96	12/17/96	12/17/96	
CAS No.	Parameter - Method (units)	Results				
	BTEX - 8020A (ug/kg)					
71-43-2	-Benzene	1.2U	1.2U	1.2U	1.3	30
108-88-3	-Toluene	1.2U	1.2U	1.2U	1.2U	12,000
108-90-7	-Chlorobenzene	1.2U	1.2U	1.2U	1.2U	1,000
95-50-1	-1,2-Dichlorobenzene	1.2U	1.2U	1.2U	1.2U	17,000
541-73-1	-1,3-Dichlorobenzene	1.2U	1.2U	1.2U	1.2U	-
106-46-7	-1,4-Dichlorobenzene	1.2U	1.2U	1.2U	1.2U	2,000
100-41-4	-Ethyl Benzene	1.2U	1.2U	1.2U	1.2U	13,000
1330-20-7	-Xylenes	3.6U	3.5U	3.6U	3.6U	150,000

TABLE 8-4
SUMMARY OF ANALYTICAL RESULTS FOR BTEX COMPOUNDS
SOIL BORING AND HAND AUGER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	SB-019	SB-023	SB-026	SB-029	Tier 1 Soil Cleanup Objectives (Class I) (1) (2)
	Sample Origin:	TWP-7	TWP-8	TWP-9	TWP-10	
	Coordinates N:	9200.6181	9944.0951	9916.3423	8835.2898	
	Coordinates E:	1246.4190	711.2203	757.6361	1237.3666	
	Elevation (MSL):	739.04	742.89	742.02	738.80	
	Sampling Depth (ft):	3 - 5	1.5 - 3.5	3.5 - 5.5	6 - 8	
	Soil Type:	Silty Clay	Silty Clay	Silty Clay	Silty Clay	
	SDG No.:	HA033	HA033	HA033	HA033	
	Lab No.:	9612056-06	9612056-07	9612056-08	9612031-03	
	Collection Date:	12/14/96	12/15/96	12/15/96	12/10/96	
	Analysis Date:	12/18/96	12/18/96	12/18/96	12/16/96	
CAS No.	Parameter - Method (units)	Results				
	BTEX - 8020A (ug/kg)					
71-43-2	-Benzene	1.2U	1.3U	1.2U	1.2U	30
108-88-3	-Toluene	1.2U	1.3U	1.2U	1.2U	12,000
108-90-7	-Chlorobenzene	1.2U	1.3U	1.2U	1.2U	1,000
95-50-1	-1,2-Dichlorobenzene	1.2U	1.3U	1.2U	1.2U	17,000
541-73-1	-1,3-Dichlorobenzene	1.2U	1.3U	1.2U	1.2U	-
106-46-7	-1,4-Dichlorobenzene	1.2U	1.3U	1.2U	1.2U	2,000
100-41-4	-Ethyl Benzene	1.2U	1.3U	1.2U	1.2U	13,000
1330-20-7	-Xylenes	3.7U	3.8U	3.5U	3.6U	150,000

(1) Unless otherwise indicated, the source of the cleanup objectives (CUOs) presented in the table is the draft version of the "Tiered Approach to Cleanup Objectives (Proposed Part 742 Regulations [2/97] published by the Illinois Environmental Protection Agency

(2) The CJO reported is the most conservative presented for the residential property scenario. In most cases the CUO reported is related to the migration to Class I Groundwater Route. If cases where the lowest CUO is related to an ingestion route, the reported CUO will be followed by (ING). In cases where the most conservative CUO is related to the inhalation route, the reported CUO is followed by (INH).

TABLE 8-5
SUMMARY OF ANALYTICAL RESULTS FOR VOLATILE ORGANICS
GROUNDWATER AND SURFACE WATER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

NAPEVILLE, ILLINOIS						
Sample No.:	GW-045	GW-055	GW-056	GW-057	Tier 1 Groundwater (1)(2)(3)	
Sample Origin:	TWP-1	MW-1	MW-2	MW-3		
Coordinates N:	8635.7863	8645.2092	8663.9372	8971.7551		
Coordinates E:	1816.1990	1019.8404	1366.7706	964.5718		
Elevation (MSL):	739.59	731.08	732.93	737.55		
SDG No.:	GW056	GW056	GW056	GW056		
Lab No.:	9612056-20	9612045-01	9612036-03	9612045-02		
Collection Date:	12/14/96	12/12/96	12/11/96	12/12/96		
Analysis Date:	12/18/96	12/18/96	12/18/96	12/18/96		
CAS No.	Parameter - Method (units)	Results				
	VOLATILES -8260A (ug/l)					
74-87-3	Chloromethane	3U	3U	3U	3U	-
74-83-9	Bromomethane	4U	4U	4U	4U	9.8
75-01-4	Vinyl Chloride	2U	2U	2U	2U	2
75-00-3	Chloroethane	4U	4U	4U	4U	710 (PRG)
75-09-2	Methylene Chloride	2U	2U	2U	2U	5
67-64-1	Acetone	10U	10U	10U	10U	700
75-15-0	Carbon Disulfide	5U	5U	5U	5U	700
75-35-4	1,1-Dichloroethene	3U	3U	3U	3U	7
75-34-3	1,1-Dichloroethane	2U	2U	2U	2U	700
540-59-0	1,2-Dichloroethene (total)	2U	2U	2U	2U	-
67-66-3	Chloroform	2U	2U	2U	2U	0.02
137-06-2	1,2-Dichloroethane	3U	3U	3U	3U	5
78-93-3	2-Butanone	10U	10U	10U	10U	1900 (PRG)
71-55-6	1,1,1-Trichloroethane	3U	3U	3U	3U	200
56-23-5	Carbon Tetrachloride	4U	4U	4U	4U	5
75-27-4	Bromodichloromethane	3U	3U	3U	3U	0.02
78-87-5	1,2-Dichloropropane	2U	2U	2U	2U	5
10061-01-5	cis-1,3-Dichloropropene	1U	1U	1U	1U	0.081 (PRG)
79-01-6	Trichloroethene	3U	3U	3U	3U	5
124-48-1	Dibromochloromethane	2U	2U	2U	2U	140
79-00-5	1,1,2-Trichloroethane	2U	2U	2U	2U	5
71-43-2	Benzene	2U	2U	2U	2U	5
10061-02-6	trans-1,3-Dichloropropene	1U	1U	1U	1U	0.081 (PRG)
75-25-2	Bromoform	1U	1U	1U	1U	0.2
108-10-1	4-Methyl-2-pentanone	11U	11U	11U	11U	2200 (PRG)
591-78-6	2-Hexanone	8U	8U	8U	8U	-
127-18-4	Tetrachloroethene	3U	3U	3U	3U	5
79-34-5	1,1,2,2-Tetrachloroethane	2U	2U	2U	2U	-
108-88-3	Toluene	7U	7U	7U	7U	1000
108-90-7	Chlorobenzene	2U	2U	2U	2U	100
100-41-4	Ethylbenzene	2U	2U	2U	2U	700
100-42-5	Styrene	3U	3U	3U	3U	100
1330-20-7	Xylene (total)	3U	3U	3U	3U	10000

TABLE 8-5
SUMMARY OF ANALYTICAL RESULTS FOR VOLATILE ORGANICS
GROUNDWATER AND SURFACE WATER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

Sample No.:	GW-058	GW-063	SW-059	GW-060	Tier 1 Groundwater (1)(2)(3)	
Sample Origin:	City Well #10	City Well #10Dup	Pond A	Pond B		
Cocordinates N:	-	-	-	-		
Cocordinates E:	-	-	-	-		
Elevation (MSL):	-	-	-	-		
SDG No.:	GW056	GW056	GW056	GW056		
Lab No.:	9612036-01	9612056-17	9612036-05	9612036-04		
Collection Date:	12/11/96	12/16/96	12/11/96	12/11/96		
Analysis Date:	12/18/96	12/18/96	12/18/96	12/18/96		
CAS No.	Parameter - Method (units)	Results				
	VOLATILES -8260A (ug/l)					
74-87-3	Chloromethane	3U	3U	3U	3U	-
74-83-9	Bromomethane	4U	4U	4U	4U	9.8
75-01-4	Vinyl Chloride	2U	2U	2U	2U	2
75-00-3	Chloroethane	4U	4U	4U	4U	710 (PRG)
75-09-2	Methylene Chloride	2U	2U	2U	2U	5
67-64-1	Acetone	10U	10U	10U	10U	700
75-15-3	Carbon Disulfide	5U	5U	5U	5U	700
75-35-4	1,1-Dichloroethene	3U	3U	3U	3U	7
75-34-3	1,1-Dichloroethane	2U	2U	2U	2U	700
540-59-0	1,2-Dichloroethene (total)	2U	2U	2U	2U	-
67-66-3	Chloroform	2U	2U	2U	2U	0.02
107-06-2	1,2-Dichloroethane	3U	3U	3U	3U	5
78-93-3	2-Butanone	10U	10U	10U	10U	1900 (PRG)
71-55-6	1,1,1-Trichloroethane	3U	3U	3U	3U	200
56-23-5	Carbon Tetrachloride	4U	4U	4U	4U	5
75-27-4	Bromodichloromethane	3U	3U	3U	3U	0.02
78-87-5	1,2-Dichloropropane	2U	2U	2U	2U	5
10061-01-5	cis-1,3-Dichloropropene	1U	1U	1U	1U	0.081 (PRG)
79-01-6	Trichloroethene	3U	3U	3U	3U	5
124-48-1	Dibromochloromethane	2U	2U	2U	2U	140
79-00-5	1,1,2-Trichloroethane	2U	2U	2U	2U	5
71-43-2	Benzene	2U	2U	2U	2U	5
10061-02-6	trans-1,3-Dichloropropene	1U	1U	1U	1U	0.081 (PRG)
75-25-2	Bromoform	1U	1U	1U	1U	0.2
108-10-1	4-Methyl-2-pentanone	11U	11U	11U	11U	2200 (PRG)
591-78-6	2-Hexanone	8U	8U	8U	8U	-
127-18-4	Tetrachloroethene	3U	3U	3U	3U	5
79-34-5	1,1,2,2-Tetrachloroethane	2U	2U	2U	2U	-
108-88-3	Toluene	7U	7U	7U	7U	1000
108-90-7	Chlorobenzene	2U	2U	2U	2U	100
100-41-4	Ethylbenzene	2U	2U	2U	2U	700
100-42-5	Styrene	3U	3U	3U	3U	100
330-20-7	Xylene (total)	3U	3U	3U	3U	10000

**TABLE 8-5
SUMMARY OF ANALYTICAL RESULTS FOR VOLATILE ORGANICS
GROUNDWATER AND SURFACE WATER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS**

Sample No.:	RS-1	TB1	TB2	Tier 1 Groundwater (1)(2)(3)	
Sample Origin:	Rinsate	Travel Blank	Travel Blank		
Coordinates N:	-	-	-		
Coordinates E:	-	-	-		
Elevation (MSL):	-	-	-		
SDG No.:	GW056	GW056	GW056		
Lab No.:	9612056-18	9612056-10	9612056-19		
Collection Date:	12/15/96	12/14/96	12/15/96		
Analysis Date:	12/18/96	12/18/96	12/18/96		
CAS No.	Parameter - Method (units)	Results			
	VOLATILES -8260A (ug/l)				
74-87-3	Chloromethane	3U	3U	3U	-
74-83-9	Bromomethane	4U	4U	4U	9.8
75-01-4	Vinyl Chloride	2U	2U	2U	2
75-00-3	Chloroethane	4U	4U	4U	710 (PRG)
75-09-2	Methylene Chloride	2U	4	4	5
57-64-1	Acetone	10U	10U	10U	700
75-15-0	Carbon Disulfide	5U	5U	5U	700
75-35-4	1,1-Dichloroethene	3U	3U	3U	7
75-34-3	1,1-Dichloroethane	2U	2U	2U	700
540-59-0	1,2-Dichloroethene (total)	2U	2U	2U	-
67-66-3	Chloroform	2U	2U	2U	0.02
107-06-2	1,2-Dichloroethane	3U	3U	3U	5
78-93-3	2-Butanone	10U	10U	10U	1900 (PRG)
71-55-6	1,1,1-Trichloroethane	3U	3U	3U	200
56-23-5	Carbon Tetrachloride	4U	4U	4U	5
75-27-4	Bromodichloromethane	3U	3U	3U	0.02
78-87-5	1,2-Dichloropropane	2U	2U	2U	5
10061-01-5	cis-1,3-Dichloropropene	1U	1U	1U	0.081 (PRG)
79-01-6	Trichloroethene	3U	3U	3U	5
124-48-1	Dibromochloromethane	2U	2U	2U	140
79-00-5	1,1,2-Trichloroethane	2U	2U	2U	5
71-43-2	Benzene	2U	2U	2U	5
10061-02-6	trans-1,3-Dichloropropene	1U	1U	1U	0.081 (PRG)
75-25-2	Bromoform	1U	1U	1U	0.2
108-10-1	4-Methyl-2-pentanone	11U	11U	11U	2200 (PRG)
591-78-6	2-Hexanone	8U	8U	8U	-
127-18-4	Tetrachloroethene	3U	3U	3U	5
79-34-5	1,1,2,2-Tetrachloroethane	2U	2U	2U	-
108-88-3	Toluene	7U	7U	7U	1000
108-90-7	Chlorobenzene	2U	2U	2U	100
100-41-4	Ethylbenzene	2U	2U	2U	700
100-42-5	Styrene	3U	3U	3U	100
1330-20-7	Xylene (total)	3U	3U	3U	10000

(1) Unless otherwise indicated, the source of the cleanup objectives (CUOs) presented in the table is the draft version of the "Tiered Approach to Cleanup Objectives (Proposed Part 742 Regulations [2/97] published by the Illinois Environmental Protection Agency

(2) The CUO reported is the most conservative presented for the residential property scenario. In most cases the CUO reported is related to the migration to Class I Groundwater Route. If cases where the lowest CUO is related to an injection route, the reported CUO will be followed by (ING). In cases where the most conservative CUO is related to the inhalation route, the reported CUO is followed by (INH).

(3) PRG - Region IX Preliminary Remediation Goals for Residential Soil (8/96).
- Indicated that no CUO was identified for a specified compound.

GV045: Library search included 2 compounds at estimated levels ranging from 14 - 32.

GV055: Library search included 1 compound at an estimated level = 7.

GV056: Library search included 2 compounds at estimated levels ranging from 5 - 8.

GV058: Library search included 4 compounds at estimated levels ranging from 8 - 18.

GV063: Library search included 1 compound at an estimated level = 6.

RS-1: Library search included 1 compound at an estimated level = 38.

TB-2: Library search included 9 compounds at estimated levels ranging from 7 - 250.

TABLE 8-6
SUMMARY OF ANALYTICAL RESULTS FOR SEMI-VOLATILE ORGANICS
GROUNDWATER AND SURFACE WATER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

Sample No.:	GW-045	GW-055	GW-056	GW-057	GW-058	Tier 1 Groundwater (1)(2)	
Sample Origin:	TWP-1	MW-1	MW-2	MW-3	City Well #10		
Coordinates N:	8635.7863	8645.2092	8663.9372	8971.7551	-		
Coordinates E:	1816.1990	1019.8404	1366.7706	964.5718	-		
Elevation (MSL):	739.59	731.08	732.93	737.55	-		
SDG No.:	GW056	GW056	GW056	GW056	GW056		
Lab No.:	9612056-20	9612045-01	9612036-03	9612045-02	9612036-01		
Collection Date:	12/14/96	12/12/96	12/11/96	12/12/96	12/11/96		
Extracted Date:	12/17/96	12/17/96	12/14/96	12/17/96	12/14/96		
Analysis Date:	01/06/97	12/24/96	12/19/96	12/24/96	12/19/96		
CAS No	Parameter	Results					
SEMI-VOLATILES - 3520B/8270B (ug/l)							
110-86-1	Pyridine	10U	10U	10U	10U	10U	-
52-75-9	N-Nitrosodimethylamine	10U	10U	10U	10U	10U	-
52-53-3	Aniline	10U	10U	10U	10U	10U	-
108-95-2	Phenol	1.5U	1.5U	1.5U	1.5U	1.5U	100
95-57-8	2-Chlorophenol	4.3U	4.3U	4.3U	4.3U	4.3U	35
111-44-4	bis(2-Chloroethyl)ether	1.2U	1.2U	1.2U	1.2U	1.2U	10
541-73-1	1,3-Dichlorobenzene	3.3U	3.3U	3.3U	3.3U	3.3U	-
106-46-7	1,4-Dichlorobenzene	3.3U	3.3U	3.3U	3.3U	3.3U	75
95-50-1	1,2-Dichlorobenzene	3.0U	3.0U	3.0U	3.0U	3.0U	600
100-51-6	Benzyl Alcohol	10U	10U	10U	10U	10U	-
95-43-7	2-Methylphenol	5.0U	5.0U	5.0U	5.0U	5.0U	350
108-60-1	2,2-oxybis(1-Chloropropane)	1.2U	1.2U	1.2U	1.2U	1.2U	-
67-72-1	Hexachloroethane	4.3U	4.3U	4.3U	4.3U	4.3U	7
621-64-7	N-Nitroso-di-n-propylamine	1.2U	1.2U	1.2U	1.2U	1.2U	10
106-44-5	4-Methylphenol	4.5U	4.5U	4.5U	4.5U	4.5U	-
98-95-3	Nitrobenzene	1.4U	1.4U	1.4U	1.4U	1.4U	3.5
8-59-1	Isophorone	1.7U	1.7U	1.7U	1.7U	1.7U	1400
86-75-5	2-Nitrophenol	4.5U	4.5U	4.5U	4.5U	4.5U	-
135-67-9	2,4-Dimethylphenol	6.8U	6.8U	6.8U	6.8U	6.8U	140
111-91-1	bis(2-Chloroethoxy)methane	1.0U	1.0U	1.0U	1.0U	1.0U	-
120-83-2	2,4-Dichlorophenol	4.1U	4.1U	4.1U	4.1U	4.1U	21
120-82-1	2,4-Trichlorobenzene	2.7U	2.7U	2.7U	2.7U	2.7U	70
91-20-3	1-Naphthalene	1.1U	1.1U	1.1U	1.1U	1.1U	25
65-65-0	Benzoic Acid	10U	10U	10U	10U	10U	28,000
106-47-8	4-Chloroaniline	2.5U	2.5U	2.5U	2.5U	2.5U	28
67-66-3	Hexachlorobutadiene	4.5U	4.5U	4.5U	4.5U	4.5U	-
59-50-7	4-Chloro-3-methylphenol	3.7U	3.7U	3.7U	3.7U	3.7U	-
91-57-6	2-Methylnaphthalene	1.4U	1.4U	1.4U	1.4U	1.4U	-
77-47-4	Hexachlorocyclopentadiene	8.3U	8.3U	8.3U	8.3U	8.3U	50
68-06-2	2,4,5-Trichlorophenol	3.4U	3.4U	3.4U	3.4U	3.4U	6.4
95-95-4	2,4,5-Trichlorophenol	3.9U	3.9U	3.9U	3.9U	3.9U	700
91-56-7	2-Chloronaphthalene	1.4U	1.4U	1.4U	1.4U	1.4U	-
68-74-4	2-Nitroaniline	2.8U	2.8U	2.8U	2.8U	2.8U	-
111-11-3	Dimethylphthalate	1.0U	1.0U	1.0U	1.0U	1.0U	-
208-96-8	Acenaphthylene	1.4U	1.4U	1.4U	1.4U	1.4U	-
60-62-2	2,6-Dinitrotoluene	0.8U	0.8U	0.8U	0.8U	0.8U	0.1
93-09-2	3-Nitroaniline	2.8U	2.8U	2.8U	2.8U	2.8U	-
83-32-9	Acenaphthene	1.3U	1.3U	1.3U	1.3U	1.3U	420
51-28-5	2,4-Dinitrophenol	4.5U	4.5U	4.5U	4.5U	4.5U	14
132-64-9	Dibenzofuran	1.2U	1.2U	1.2U	1.2U	1.2U	-
100-02-7	4-Nitrophenol	3.3U	3.3U	3.3U	3.3U	3.3U	-
121-14-2	2,4-Dinitrotoluene	1.5U	1.5U	1.5U	1.5U	1.5U	0.02
86-73-7	Fluorene	1.0U	1.0U	1.0U	1.0U	1.0U	280
84-66-2	Diethylphthalate	0.8U	0.8U	0.8U	0.8U	0.8U	5600
701-572-3	4-Chlorophenyl-phenyl ether	0.8U	0.8U	0.8U	0.8U	0.8U	-
100-01-6	4-Nitroaniline	7.6U	7.6U	7.6U	7.6U	7.6U	-
534-52-1	4,6-Dinitro-2-methylphenol	4.1U	4.1U	4.1U	4.1U	4.1U	-
83-30-6	N-Nitrosodiphenylamine	1.8U	1.8U	1.8U	1.8U	1.8U	10
122-66-7	1,2-Diphenylhydrazine	10U	10U	10U	10U	10U	-
126-73-3	Tributyl Phosphate	10U	10U	10U	10U	10U	-
101-55-3	4-Bromophenyl-phenylether	1.0U	1.0U	1.0U	1.0U	1.0U	-
116-74-1	Hexachlorobenzene	0.9U	0.9U	0.9U	0.9U	0.9U	0.06
87-86-5	Pentachlorophenol	2.9U	2.9U	2.9U	2.9U	2.9U	1
92-87-5	Benzidine	10U	10U	10U	10U	10U	-
86-01-8	Phenanthrene	0.7U	0.7U	0.7U	0.7U	0.7U	-
123-12-7	Anthracene	1.2U	1.2U	1.2U	1.2U	1.2U	2100
86-74-8	Carbazole	2.1U	2.1U	2.1U	2.1U	2.1U	-
84-74-2	Di-n-butylphthalate	1.1U	1.1U	1.1U	1.1U	1.1U	700
205-44-0	Fluoranthene	1.0U	1.0U	1.0U	1.0U	1.0U	280
129-00-0	Pyrene	1.2U	1.2U	1.2U	1.2U	1.2U	210
84-68-7	Butylbenzylphthalate	1.3U	1.3U	1.3U	1.3U	1.3U	1400
56-55-3	Benzo(a)anthracene	0.56U	0.56U	0.56U	0.56U	0.56U	0.13
91-94-1	3,3-Dichlorobenzidine	4.6U	4.6U	4.6U	4.6U	4.6U	20
213-01-9	Chrysene	1.1U	1.1U	1.1U	1.1U	1.1U	1.5
117-81-7	bis(2-Ethylhexyl)phthalate	2.9U	3.6U	3.6U	3.6U	3.6U	6
117-84-0	D-n-octylphthalate	1.4U	1.4U	1.4U	1.4U	1.4U	140
205-99-2	Benzo(b)fluoranthene	0.18U	0.18U	0.18U	0.18U	0.18U	0.18
207-08-9	Benzo(k)fluoranthene	0.17U	0.17U	0.17U	0.17U	0.17U	0.17
50-32-8	Benzo(a)pyrene	0.20U	0.20U	0.20U	0.20U	0.20U	0.2
193-39-5	Indeno(1,2,3-cd)pyrene	0.43U	0.43U	0.43U	0.43U	0.43U	0.43
53-70-3	Dibenzo(a,h)anthracene	0.30U	0.30U	0.30U	0.30U	0.30U	0.3
191-24-2	Benzo(g,h,i)perylene	2.7U	2.7U	2.7U	2.7U	2.7U	-

**TABLE 1-4
SUMMARY OF ANALYTICAL RESULTS FOR SEMI-VOLATILE ORGANICS
GROUNDWATER AND SURFACE WATER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS**

Sample No.:	GW-063	SW-059	SW-060	RS-1	Tier 1 Groundwater (1)(2)
Sample Origin:	City Well #10Dup	Pond A	Pond B	Rinsate	
Coordinates N:	-	-	-	-	
Coordinates E:	-	-	-	-	
Elevation (MSL):	-	-	-	-	
SDG No.:	GW056	GW056	GW056	GW056	
Lab No.:	9612056-17	9612036-05	9612036-04	9612056-18	
Collection Date:	12/16/96	12/11/96	12/11/96	12/15/96	
Extracted Date:	12/14/96	12/14/96	12/14/96	12/17/96	
Analysis Date:	12/19/96	12/20/96	12/20/96	12/24/96	
CAS No	Parameter - Method (units)				Results
SEMI-VOLATILES - 3520B/8270B (ug/l)					
110-86-1	Pyridine	10U	10U	10U	-
62-75-9	N-Nitrosodimethylamine	10U	10U	10U	-
62-53-3	Aniline	10U	10U	10U	-
108-95-2	Phenol	1.5U	1.5U	1.5U	100
95-57-8	2-Chlorophenol	4.3U	4.3U	4.3U	35
111-44-4	bis(2-Chloroethyl)ether	1.2U	1.2U	1.2U	10
541-73-1	1,3-Dichlorobenzene	3.3U	3.3U	3.3U	-
106-46-7	1,4-Dichlorobenzene	3.3U	3.3U	3.3U	75
95-50-1	1,2-Dichlorobenzene	3.0U	3.0U	3.0U	600
100-51-6	Benzyl Alcohol	10U	10U	10U	-
95-48-7	2-Methylphenol	5.0U	5.0U	5.0U	350
108-60-1	2,2-dybis(1-Chloropropane)	1.2U	1.2U	1.2U	-
67-72-1	Hexachloroethane	4.3U	4.3U	4.3U	7
621-64-7	N-Nitroso-d-n-propylamine	1.2U	1.2U	1.2U	10
106-44-5	4-Methylphenol	4.5U	4.5U	4.5U	-
98-95-3	Nitrobenzene	1.4U	1.4U	1.4U	3.5
78-59-1	Isophorone	1.7U	1.7U	1.7U	1400
88-75-5	2-Nitrophenol	4.5U	4.5U	4.5U	-
105-67-9	2,4-Dimethylphenol	6.8U	6.8U	6.8U	140
111-91-1	bis(2-Chloroethoxy)methane	1.0U	1.0U	1.0U	-
120-83-2	2,4-Dichlorophenol	4.1U	4.1U	4.1U	21
120-82-1	1,2,4-Trichlorobenzene	2.7U	2.7U	2.7U	70
91-20-3	Naphthalene	1.1U	1.1U	1.1U	25
65-85-0	Benzoic Acid	10U	10U	10U	28,000
106-47-8	4-Chloroaniline	2.5U	2.5U	2.5U	28
87-68-3	Hexachlorobutadiene	4.5U	4.5U	4.5U	-
59-50-7	4-Chloro-3-methylphenol	3.7U	3.7U	3.7U	-
91-57-6	2-Methylnaphthalene	1.4U	1.4U	1.4U	-
77-47-4	Hexachlorocyclopentadiene	8.3U	8.3U	8.3U	50
88-06-2	2,4,6-Trichlorophenol	3.4U	3.4U	3.4U	6.4
95-95-4	2,4,5-Trichlorophenol	3.9U	3.9U	3.9U	700
91-58-7	2-Chloronaphthalene	1.4U	1.4U	1.4U	-
88-74-4	2-Nitroaniline	2.8U	2.8U	2.8U	-
131-11-3	Dimethylphthalate	1.0U	1.0U	1.0U	-
208-96-8	Acenaphthylene	1.4U	1.4U	1.4U	-
606-20-2	2,6-Dinitrotoluene	0.8U	0.8U	0.8U	0.1
99-09-2	3-Nitroaniline	2.8U	2.8U	2.8U	-
83-32-9	Acenaphthene	1.3U	1.3U	1.3U	420
51-28-5	2,4-Dinitrophenol	4.5U	4.5U	4.5U	14
132-64-9	Dibenzofuran	1.2U	1.2U	1.2U	-
100-02-7	4-Nitrophenol	3.3U	3.3U	3.3U	-
121-14-2	2,4-Dinitrotoluene	1.5U	1.5U	1.5U	0.02
86-73-7	Fluorene	1.0U	1.0U	1.0U	280
84-66-2	Diethylphthalate	0.8U	0.8U	0.8U	5600
7005-72-3	4-Chlorophenyl-phenyl ether	0.8U	0.8U	0.8U	-
100-01-6	4-Nitroaniline	7.6U	7.6U	7.6U	-
534-52-1	4,6-Dinitro-2-methylphenol	4.1U	4.1U	4.1U	-
86-30-6	N-Nitrosodiphenylamine	1.8U	1.8U	1.8U	10
122-66-7	1,2-Diphenylhydrazine	10U	10U	10U	-
126-73-3	Tributyl Phosphate	10U	10U	10U	-
101-55-3	4-Bromophenyl-phenylether	1.0U	1.0U	1.0U	-
118-74-1	Hexachlorobenzene	0.9U	0.9U	0.9U	0.06
87-86-5	Pentachlorophenol	2.9U	2.9U	2.9U	1
92-87-5	Benidine	10U	10U	10U	-
85-01-8	Phenanthrene	0.7U	0.7U	0.7U	-
120-12-7	Anthracene	1.2U	1.2U	1.2U	2100
86-74-8	Carbazole	2.1U	2.1U	2.1U	-
84-74-2	Di-n-butylphthalate	1.1U	1.1U	1.1U	700
206-44-0	Fluoranthene	1.0U	1.0U	1.0U	280
129-00-0	Pyrene	1.2U	1.2U	1.2U	210
85-68-7	Bis(benzyl)phthalate	1.3U	1.3U	1.3U	1400
56-55-3	Benzo(a)anthracene	0.56U	0.56U	0.56U	0.13
91-94-1	3,3'-Dichlorobenzidine	4.6U	4.6U	4.6U	20
218-01-9	Chrysene	1.1U	1.1U	1.1U	1.5
17-81-7	bis(2-Ethylhexyl)phthalate	32	2.6J	3.6U	6
17-84-0	Di-n-octylphthalate	1.4U	1.4U	1.4U	140
205-99-2	Benzo(b)fluoranthene	0.18U	0.18U	0.18U	0.18
207-08-9	Benzo(k)fluoranthene	0.17U	0.17U	0.17U	0.17
50-32-8	Benzo(a)pyrene	0.20U	0.20U	0.20U	0.2
93-39-5	Indeno(1,2,3-cd)pyrene	0.43U	0.43U	0.43U	0.43
53-70-3	Dibenzo(a,h)anthracene	0.30U	0.30U	0.30U	0.3
91-24-2	Benzo(g,h,i)perylene	2.7U	2.7U	2.7U	-

(1) Unless otherwise indicated, the source of the cleanup objectives (CUOs) presented in the table is the draft version of the Tiered Approach to Cleanup Objectives (Proposed Part 742 Regulations [297] published by the Illinois Environmental Protection Agency

(2) The CUO reported is the most conservative presented for the residential property scenario. In most cases the CUO reported is related to the migration to Class I Groundwater Route. If cases where the lowest CUO is related to an ingestion route, the reported CUO will be followed by (ING). In cases where the most conservative CUO is related to the inhalation route, the reported CUO is followed by (INH).

GW045. Library search included 30 compounds at estimated levels ranging from 4 - 56.
 GW055. Library search included 7 compounds at estimated levels ranging from 2 - 13.
 GW056. Library search included 30 compounds at estimated levels ranging from 0.9 - 22.
 GW057. Library search included 30 compounds at estimated levels ranging from 2 - 24.
 GW058. Library search included 13 compounds at estimated levels ranging from 0.3 - 21.
 GW063. Library search included 7 compounds at estimated levels ranging from 0.7 - 5.
 RS-1. Library search included 11 compounds at estimated levels ranging from 1 - 6.
 SW059. Library search included 28 compounds at estimated levels ranging from 0.4 - 23.
 SW060. Library search included 26 compounds at estimated levels ranging from 0.4 - 15.

TABLE 8-7
SUMMARY OF ANALYTICAL RESULTS FOR DISSOLVED METALS (As, Cr, Pb)
GROUNDWATER AND SURFACE WATER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	GW-045	GW-046	GW-047	GW-048	Tier 1 Groundwater (1)
	Sample Origin:	TWP-1	TWP-2	TWP-3	TWP-4	
	Coordinates N:	8635.7863	8958.6262	9154.3576	9090.9983	
	Coordinates E:	1816.1990	1533.0591	1445.9267	1128.1270	
	Elevation (MSL):	739.59	736.76	738.91	739.06	
	SDG No.:	GW056	GW046	GW046	GW046	
	Lab No.:	9612056-20	9612031-02	9612056-11	9612056-12	
	Collection Date:	12/14/96	12/10/96	12/15/96	12/15/96	
CAS No.	Parameter - Method (units)	Results				
7440-38-2	Arsenic - 3050A/7060A (ug/l)	2.7B	1.0U	1.0U	1.0U	50
7440-47-3	Chromium - 3050A/6010A (ug/l)	4.0U	4.0U	4.0U	4.0U	100
7439-92-1	Lead - 3050A/7421 (ug/l)	1.0U	1.0U	1.0U	10.4	7.5

TABLE 8-7
SUMMARY OF ANALYTICAL RESULTS FOR DISSOLVED METALS (As, Cr, Pb)
GROUNDWATER AND SURFACE WATER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	GW-061	GW-049	GW-050	GW-051	Tier 1 Groundwater (1)
	Sample Origin:	TWP-4Dup	TWP-5	TWP-6	TWP-7	
	Coordinates N:	9090.9983	8763.6929	9017.1328	9200.6181	
	Coordinates E:	1128.1270	1021.5991	1050.5759	1246.4190	
	Elevation (MSL):	739.06	737.10	737.13	739.04	
	SDG No.:	GW046	GW046	GW046	GW046	
	Lab No.:	9612056-16	9612052-01	9612056-13	9612056-22	
	Collection Date:	12/14/96	12/13/96	12/14/96	12/14/96	
CAS No.	Parameter - Method (units)	Results				
7440-38-2	Arsenic - 3050A/7060A (ug/l)	1.0U	1.0U	1.0U	1.0U	50
7440-47-3	Chromium - 3050A/6010A (ug/l)	4.0U	4.0U	4.0U	4.0U	100
7439-92-1	Lead - 3050A/7421 (ug/l)	1.0U	1.0U	1.0U	1.0U	7.5

TABLE 8-7
SUMMARY OF ANALYTICAL RESULTS FOR DISSOLVED METALS (As, Cr, Pb)
GROUNDWATER AND SURFACE WATER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	GW-052	GW-053	GW-054	GW-055	Tier 1 Groundwater (1)
	Sample Origin:	TWP-8	TWP-9	TWP-10	MW-1	
	Coordinates N:	9944.0951	9916.3423	8835.2898	8645.2092	
	Coordinates E:	711.2203	757.6361	1237.3666	1019.8404	
	Elevation (MSL):	742.89	742.02	738.80	731.08	
	SDG No.:	GW046	GW046	GW046	GW056	
	Lab No.:	9612056-14	961205-15	9612031-01	9612045-01	
	Collection Date:	12/16/96	12/15/96	12/10/96	12/12/96	
CAS No.	Parameter - Method (units)	Results				
7440-38-2	Arsenic - 3050A/7060A (ug/l)	1.0U	1.0U	1.0U	1.0U	50
7440-47-3	Chromium - 3050A/6010A (ug/l)	4.0U	4.0U	4.0U	4.0U	100
7439-92-1	Lead - 3050A/7421 (ug/l)	1.0U	1.0U	1.0U	1.0U	7.5

TABLE 8-7
SUMMARY OF ANALYTICAL RESULTS FOR DISSOLVED METALS (As, Cr, Pb)
GROUNDWATER AND SURFACE WATER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	GW-056	GW-057	GW-058	GW-063	Tier 1 Groundwater (1)
	Sample Origin:	MW-2	MW-3	City Well #10	City Well #10Dup	
	Coordinates N:	8663.9372	8971.7551	-	-	
	Coordinates E:	1366.7706	964.5718	-	-	
	Elevation (MSL):	732.93	737.55	-	-	
	SDG No.:	GW056	GW056	GW056	GW046	
	Lab No.:	9612036-03	9612045-02	9612036-01	9612036-02	
	Collection Date:	12/11/96	12/12/96	12/11/96	12/16/96	
CAS No.	Parameter - Method (units)	Results				
7440-38-2	Arsenic - 3050A/7060A (ug/l)	1.0U	1.0U	1.0U	1.0U	50
7440-47-3	Chromium - 3050A/6010A (ug/l)	4.0U	4.0U	4.0U	4.0U	100
7439-92-1	Lead - 3050A/7421 (ug/l)	1.0U	1.0U	1.0U	1.0U	7.5

TABLE 8-7
SUMMARY OF ANALYTICAL RESULTS FOR DISSOLVED METALS (As, Cr, Pb)
GROUNDWATER AND SURFACE WATER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	RS-1	SW-059	SW-060	Tier 1 Groundwater (1)
	Sample Origin:	Rinsate	Pond A	Pond B	
	Coordinates N:	-	-	-	
	Coordinates E:	-	-	-	
	Elevation (MSL):	-	-	-	
	SDG No.:	GW056	GW056	GW046	
	Lab No.:	9612056-18	9612036-05	9612036-04	
	Collection Date:	12/15/96	12/11/96	12/11/96	
CAS No.	Parameter - Method (units)	Results			
7440-38-2	Arsenic - 3050A/7060A (ug/l)	1.0U	1.0U	1.0U	50
7440-47-3	Chromium - 3050A/6010A (ug/l)	4.0U	4.0U	4.0U	100
7439-92-1	Lead - 3050A/7421 (ug/l)	1.0U	1.0U	1.0U	7.5

TABLE 8-8
SUMMARY OF ANALYTICAL RESULTS FOR TOTAL METALS (As, Cr, Pb)
GROUNDWATER AND SURFACE WATER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	GW-063	GW-064	SW-059	SW-060	Tier 1 Groundwater (1)
	Sample Origin:	City Well #10	City Well #10	Pond A	Pond B	
	Coordinates N:	-	-	-	-	
	Coordinates E:	-	-	-	-	
	Elevation (MSL):	-	-	-	-	
	SDG No.:	GW063	GW063	GW063	GW063	
	Lab No.:	9612056-17	9612056-21	9612036-05	9612036-04	
	Collection Date:	12/16/96	12/16/96	12/11/96	12/11/96	
CAS No.	Parameter - Method (units)	Results				
7440-38-2	Arsenic - 3050A/7060A (ug/l)	14.1	13.9	1.0U	1.4B	50
7440-47-3	Chromium - 3050A/6010A (ug/l)	5.2B	4.4B	4.0U	4.0U	100
7439-92-1	Lead - 3050A/7421 (ug/l)	5.2	6.1	3.2	1.0U	7.5

TABLE 8-9
SUMMARY OF ANALYTICAL RESULTS FOR BTEX COMPOUNDS
GROUNDWATER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	GW-046	GW-047	GW-048	GW-061	GW-049	Tier 1 Groundwater (1)
	Sample Origin:	TWP-2	TWP-3	TWP-4	TWP-4Dup	TWP-5	
	Coordinates N:	8958.6262	9154.3576	9090.9983	9090.9983	8763.6929	
	Coordinates E:	1533.0591	1445.9267	1128.1270	1128.1270	1021.5991	
	Elevation (MSL):	736.76	738.91	739.06	739.06	737.10	
	SDG No.:	GW046	GW046	GW046	GW046	GW046	
	Lab No.:	9612031-02	9612056-11	9612056-12	9612056-16	9612052-01	
	Collection Date:	12/10/96	12/15/96	12/15/96	12/14/96	12/13/96	
	Analysis Date:	12/13/96	12/19/96	12/23/96	12/23/96	12/17/96	
CAS No.	Parameter - Method (units)	Results					
	BTEX - 8020A (ug/l)						
71-43-2	-Benzene	1.0U	1.0U	1.0U	1.0U	1.0U	5
108-88-3	-Toluene	1.0	1.0U	1.0U	1.0U	1.0U	1,000
108-90-7	-Chlorobenzene	1.0U	1.0U	1.0U	1.0U	1.0U	100
95-50-1	-1,2-Dichlorobenzene	1.0U	1.0U	1.0U	1.0U	1.0U	600
541-73-1	-1,3-Dichlorobenzene	1.0U	1.0U	1.0U	1.0U	1.0U	-
106-46-7	-1,4-Dichlorobenzene	1.0U	1.0U	1.0U	1.0U	1.0U	75
100-41-4	-Ethyl Benzene	1.0U	1.0U	1.0U	1.0U	1.0U	700
1330-20-7	-Xylenes	3.0U	3.0U	3.0U	3.0U	3.0U	10,000

TABLE 8-9
SUMMARY OF ANALYTICAL RESULTS FOR BTEX COMPOUNDS
GROUNDWATER SAMPLES
FOCUSED SITE INVESTIGATION
FORMER NIKE MISSILE BATTERY, C-70 SITE
NAPERVILLE, ILLINOIS

	Sample No.:	GW-050	GW-051	GW-052	GW-053	GW-054	Tier 1 Groundwater (1)
	Sample Origin:	TWP-6	TWP-7	TWP-8	TWP-9	TWP-10	
	Coordinates N:	9017.1328	9200.6181	9944.0951	9916.3423	8835.2898	
	Coordinates E:	1050.5759	1246.4190	711.2203	757.6361	1237.3666	
	Elevation (MSL):	737.13	739.04	742.89	742.02	738.80	
	SDG No.:	GW046	GW046	GW046	GW046	GW046	
	Lab No.:	9612056-13	9612056-22	9612056-14	961205-15	9612031-01	
	Collection Date:	12/14/96	12/14/96	12/16/96	12/15/96	12/10/96	
	Analysis Date:	12/23/06	12/23/96	12/23/96	12/23/96	12/13/96	
CAS No.	Parameter - Method (units)	Results					
	BTEX - 8020A (ug/l)						
71-43-2	-Benzene	1.0U	1.0U	1.0U	1.0U	1.0U	5
108-88-3	-Toluene	1.1	1.2	1.8	1.2	1.0U	1,000
108-90-7	-Chlorobenzene	1.0U	1.0U	1.0U	1.0U	1.0U	100
95-50-1	-1,2-Dichlorobenzene	1.0U	1.0U	1.0U	1.0U	1.0U	600
541-73-1	-1,3-Dichlorobenzene	1.0U	1.0U	1.0U	1.0U	1.0U	-
106-46-7	-1,4-Dichlorobenzene	1.0U	1.0U	1.0U	1.0U	1.0U	75
100-41-4	-Ethyl Benzene	1.0U	1.0U	1.0U	1.0U	1.0U	700
1330-20-7	-Xylenes	3.0U	3.0U	3.0U	3.0U	3.0U	10,000

(1) The source of the cleanup objectives (CUO's) presented in the table is the draft version of the "Tiered Approach to Cleanup Objectives " (Proposed Part 742 Regulations [2/97]) published by the Illinois Environmental Protection Agency.

TABLE 8-10**COMPARISON OF THE XRF ANALYTICAL RESULTS
WITH THE CONFORMATION ANALYSIS
PERFORMED IN THE MAXIM LABORATORY****Arsenic Results (mg/Kg)**

Sample ID	XRF Results	Laboratory Results
HA-31	14.0	10.8
HA-32	9.0	12.2
HA-45	14.2	9.8
HA-34	11.7	9.0
HA-36	7.6	8.0
HA-38	9.9	10.2
HA-40	13.0	12.7
HA-42	9.8	10.6
B1-001	11.9	11.7
B1-002	13.5	15.1
B1-003	11.5	2.9
B1-004	19.0	11.1
B1-007	12.9	9.0
B1-011	11.7	14.7
B1-043	20.9	14.0
B1-015	9.5	3.9
B1-016	20.3	10.6
B1-019	20.9	11.7
B1-022	21.9	12.4
B1-026	9.2	8.8
B1-028	16.0	13.6

TABLE 8-10**COMPARISON OF THE XRF ANALYTICAL RESULTS
WITH THE CONFORMATION ANALYSIS
PERFORMED IN THE MAXIM LABORATORY****Chromium Results (mg/Kg)**

Sample ID	XRF Results	Laboratory Results
HA-31	53.5	8.8
HA-32	52.0	19.7
HA-45	65.2	10.3
HA-34	48.2	15.1
HA-36	47.7	13.3
HA-38	55.8	13.8
HA-40	63.0	19.7
HA-42	36.2	20.3
B1-001	43.1	22.9
B1-002	77.4	20.4
B1-003	41.4	4.6
B1-004	72.9	14.6
B1-007	61.3	13.2
B1-011	51.5	11.7
B1-043	51.4	10.1
B1-015	45.7	5.1
B1-016	55.2	15.7
B1-019	60.9	12.3
B1-022	78.7	19.0
B1-026	82.6	16.0
B1-028	89.3	18.7

TABLE 8-10**COMPARISON OF THE XRF ANALYTICAL RESULTS
WITH THE CONFORMATION ANALYSIS
PERFORMED IN THE MAXIM LABORATORY****Lead Results (mg/Kg)**

Sample ID	XRF Results	Laboratory Results
HA-31	18.3	15.7
HA-32	22.5	21.8
HA-45	17.5	14.4
HA-34	14.9	23.8
HA-36	21.5	19.9
HA-38	19.9	19.0
HA-40	21.2	17.9
HA-42	16.9	25.9
B1-001	12.4	20.2
B1-002	17.3	17.9
B1-003	<MDL	3.2
B1-004	11.0	15.2
B1-007	21.9	16.6
B1-011	13.4	18.1
B1-043	12.2	17.9
B1-015	<MDL	4.1
B1-016	14.3	14.6
B1-019	16.6	15.8
B1-022	12.6	18.1
B1-026	21.5	14.3
B1-028	16.1	17.0

USEPA QUALIFIERS FOR ANALYTICAL RESULTS

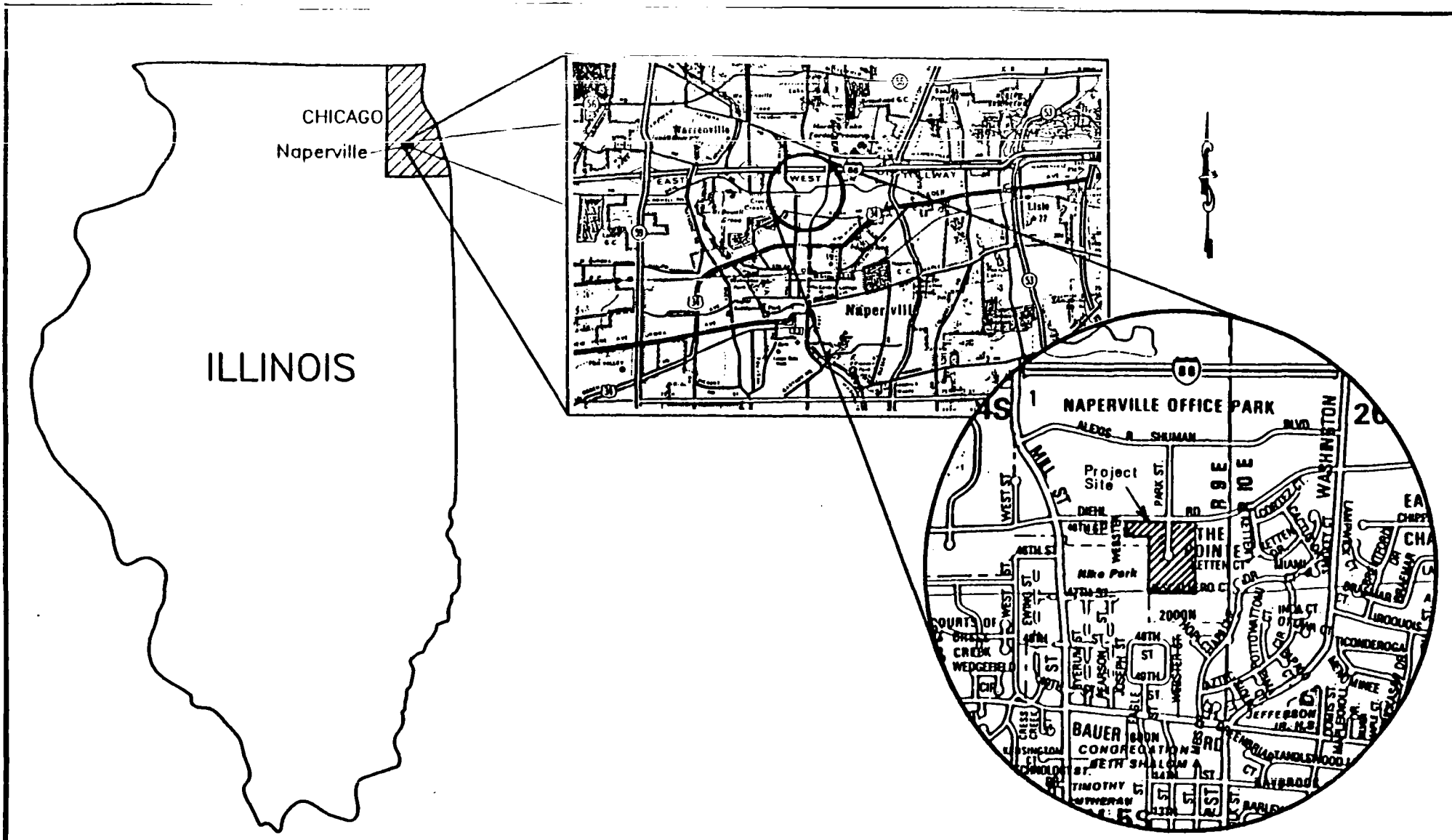
ORGANIC COMPOUND QUALIFIERS

- U = Indicates compound was analyzed for but not detected.
- J = Indicates an estimated value.
- N = Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds.
- P = This flag is used for a pesticide/Aroclor target analyte where there is greater than 25% difference for detected concentrations between the two GC columns.
- C = This flag applies to pesticide results where the identification has been confirmed by GC/MS.
- B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- E = This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis.
- D = This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- A = This flag indicates that a tentatively identified compound (TIC) is a suspected aldol-condensation product.
- X = Other specific flags may be required to properly define the results. If used, they must be fully described and such description attached to the Sample Data Summary Package and the SDG Narrative.

INORGANIC COMPOUND QUALIFIERS

- C = Concentration qualifier - Enter "B" if the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL). If the analyte was analyzed for but not detected, a "U" must be entered.
- Q = Qualifier - Specified entries and their meanings are as follows:
 - E = The reported value is estimated because of the presence of interference.
 - M = Duplicate injection precision not met.
 - N = Spiked sample recovery not within control limits.
 - S = The reported value was determined by the Method of Standard Additions (MSA).
 - W = Post-digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.
 - * = Duplicate analysis not within control limits.
 - + = Correlation coefficient for the MSA is less than 0.995.

FIGURES



**Regional Map
Former Nike Missile Battery C-70 Site
Naperville, Illinois**

MAXIM SAINT LOUIS
TECHNOLOGIES, INC.

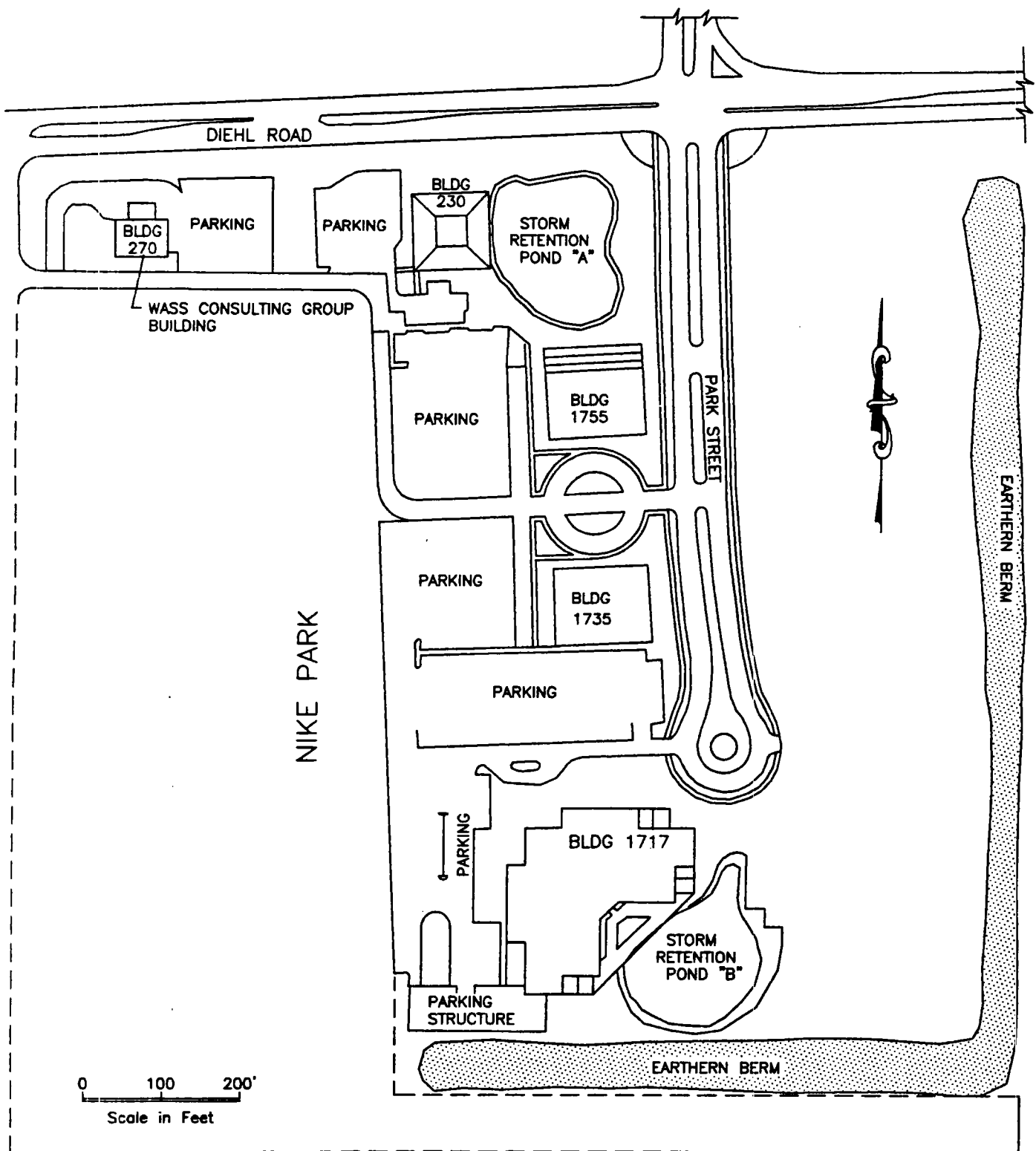
Project No. 4294

Drawn By: *OK*

Date: April '97

Chk'd By: *PWS*

Figure 3-1



Site Map
Former Nike Missile Battery C-70 Site
Naperville, Illinois

MAXIM SAINT LOUIS
TECHNOLOGIES INC

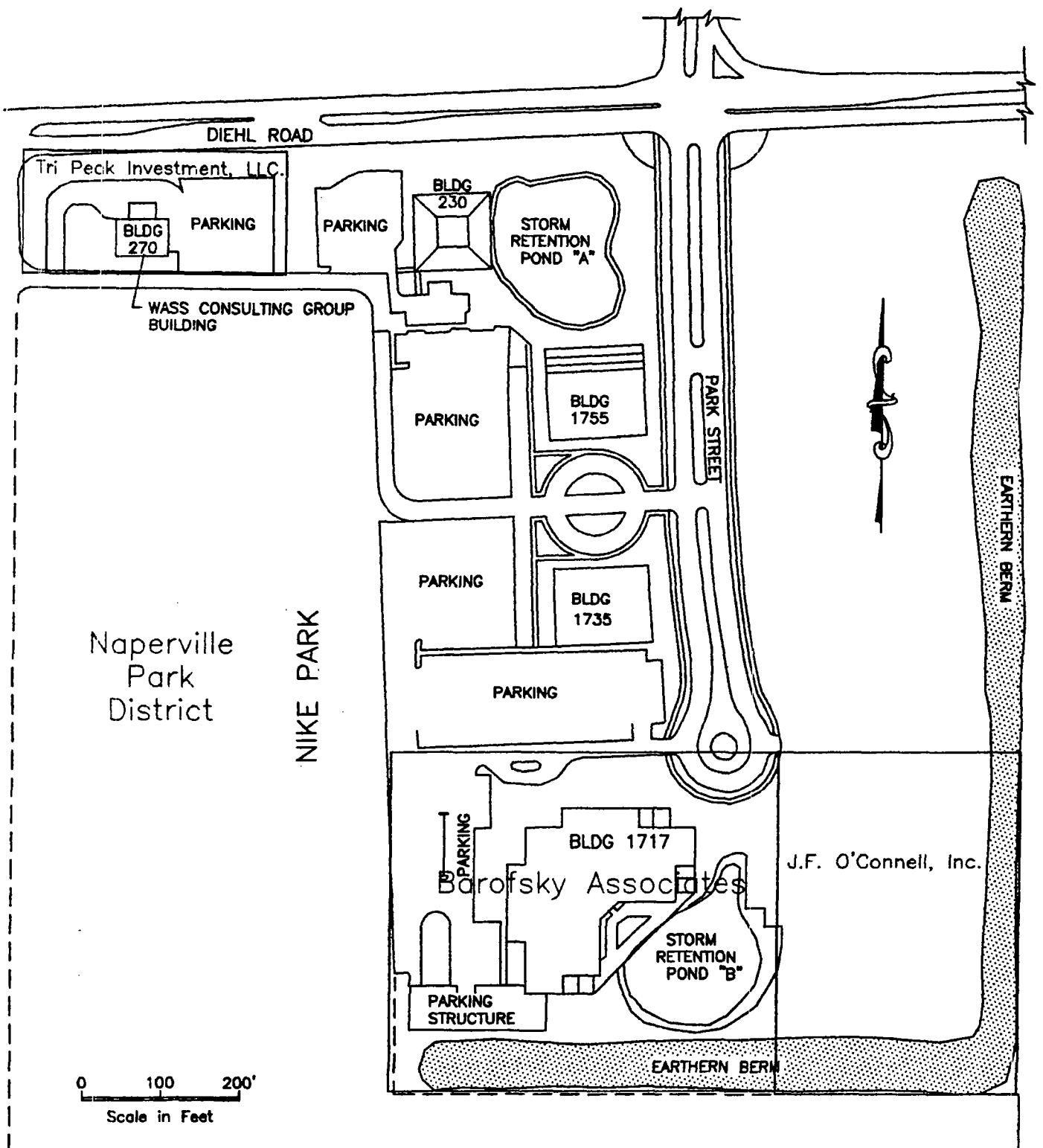
Project No. 4294

Drawn By *Dr*

Date: 10-2-97

Chk'd By: *pws*

Figure 3-2



Approximate Boundaries and Owners for
Each Area of Concern
Former Nike Missile Battery C-70
Naperville, Illinois

MAXIM SAINT LOUIS
TECHNOLOGIES INC

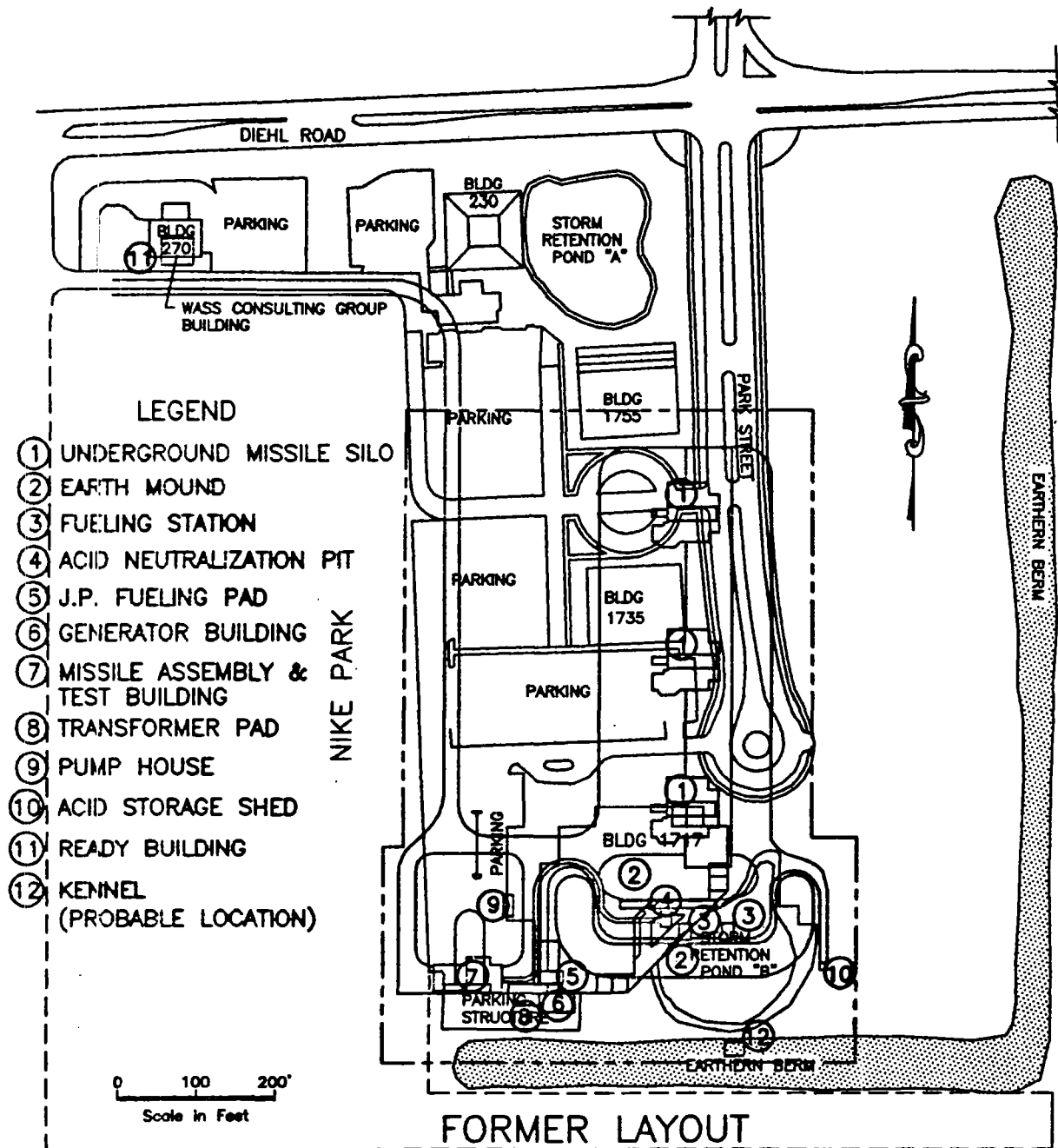
Project No. 4294

Drawn By: *[Signature]*

Date: 10-3-97

Chk'd By: *[Signature]*

Figure 3-3



Site Layout Map
 Overlay of Nike Battery Features
 Former Nike Missile Battery C-70 Site
 Naperville, Illinois

MAXIM SAINT LOUIS
TECHNOLOGIES INC

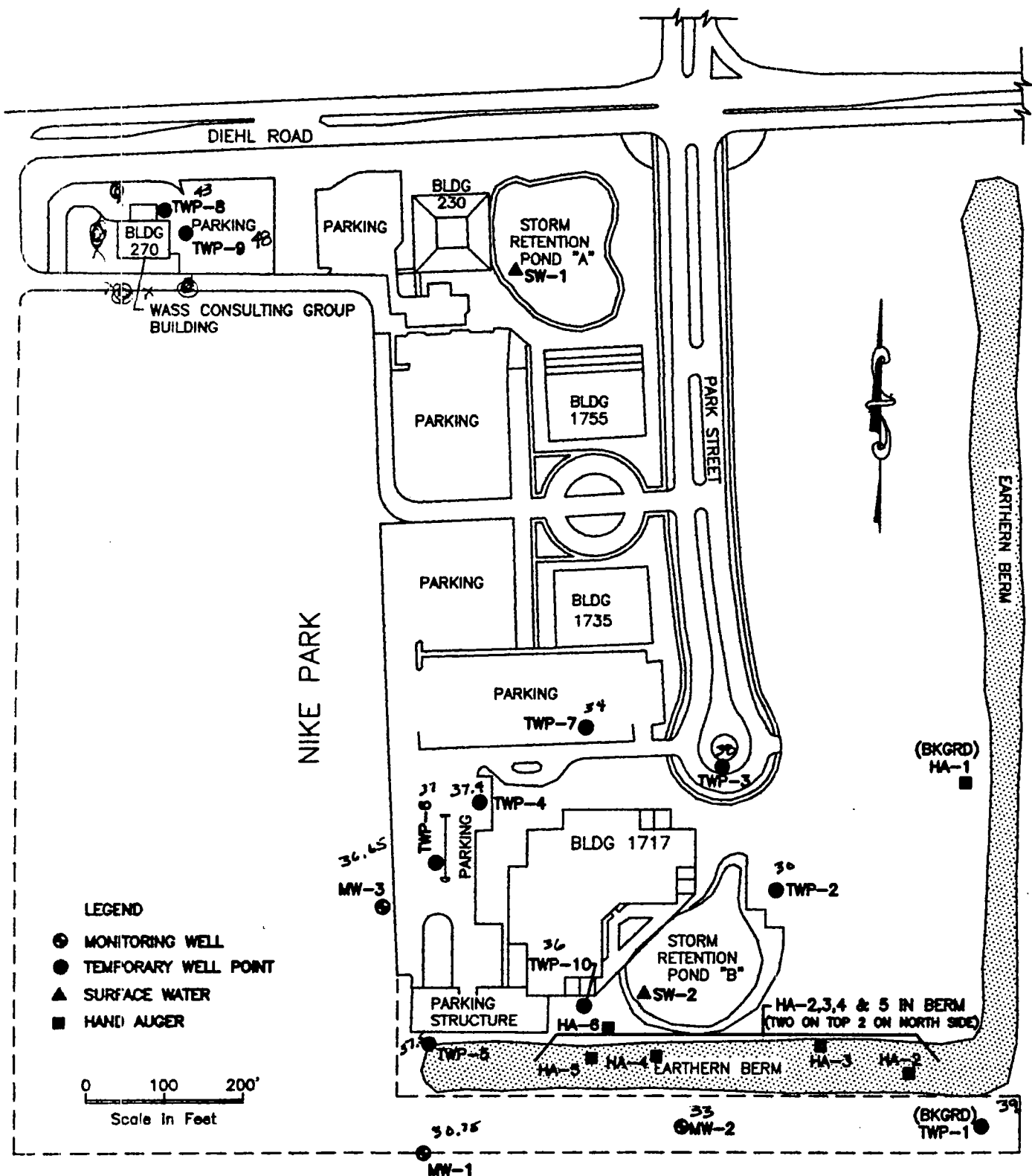
Project No. 4294

Drawn By:

Date: 10-3-97

Chk'd By: pws

Figure 3-4



Sample Location Map
Former Nike Missile Battery C-70 Site
Naperville, Illinois

MAXIM SAINT LOUIS
TECHNOLOGIES INC

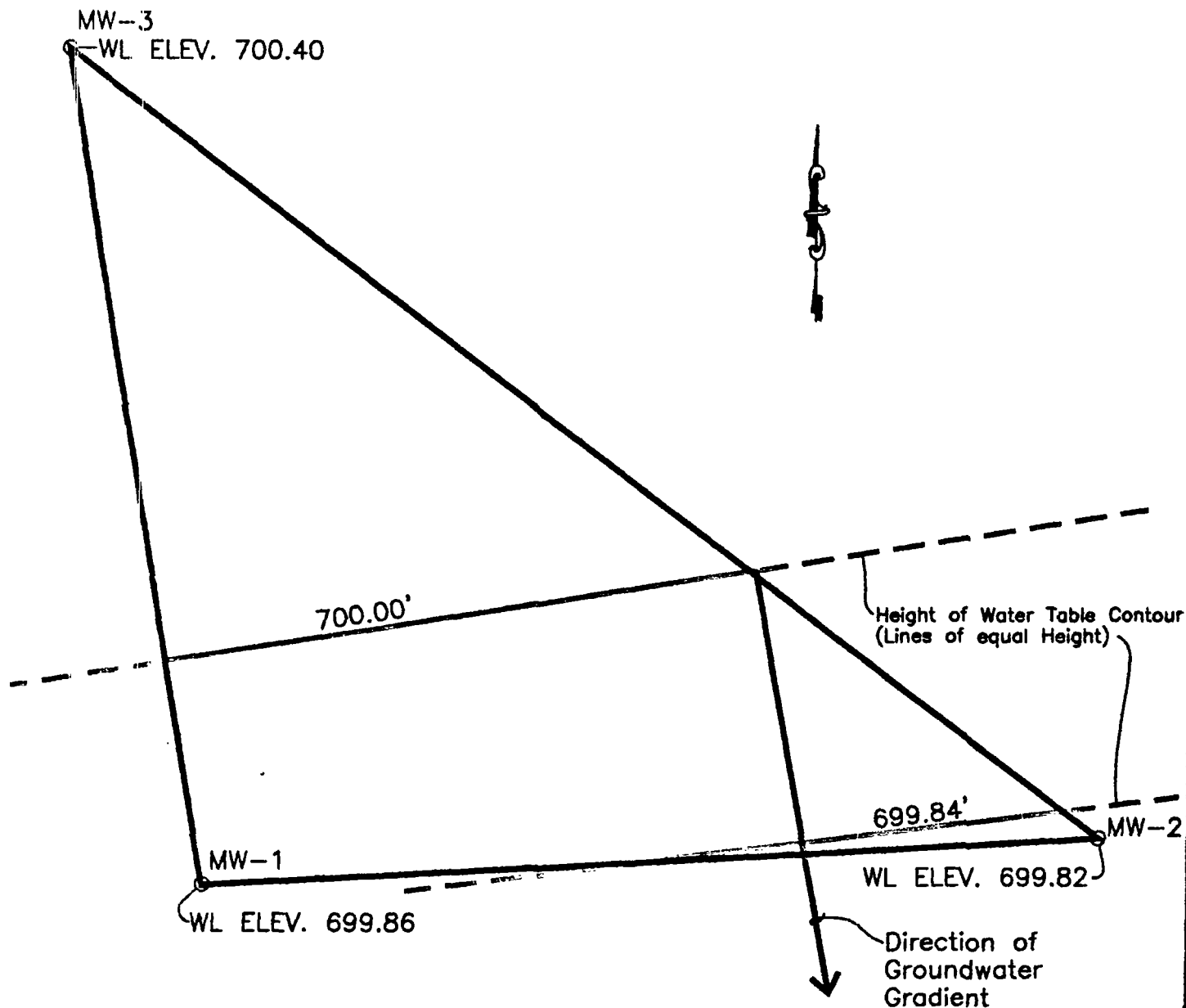
Project No. 4294

Drawn By: *[Signature]*

Date: 10-3-97

Chk'd By: *[Signature]*

Figure 4-1



Data Collected 12-12-96

Direction of Groundwater Gradient
Former Nike Missile Battery C-70
Naperville, Illinois

MAXIM SAINT LOUIS
TECHNOLOGIES INC

Project No. 4294

Drawn By: *AK*

Date: 8-13-97

Chk'd By: *PWS*

Figure 5-1